



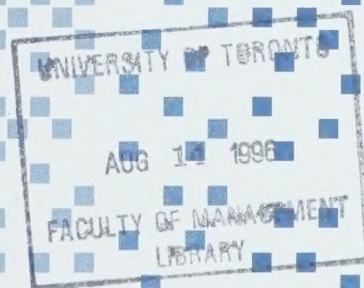
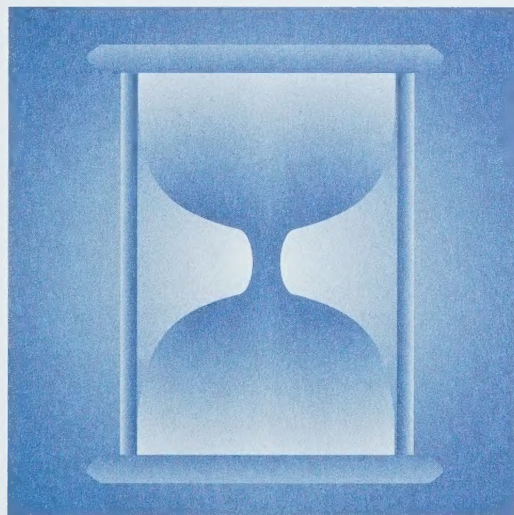
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# The Statistics Canada Total Work Accounts System

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# The Statistics Canada Total Work Accounts System

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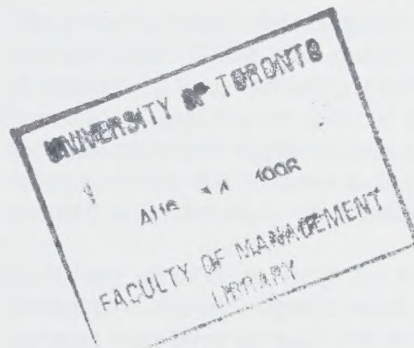
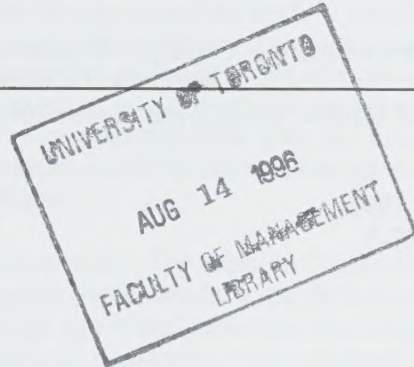
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## Preface

In the 1960s, the concerns of policy makers and of interest groups with work were focussed heavily on paid employment or work undertaken to earn profits in a business; that is, with market work. Market work was widely thought to be the only form of work that was important for the performance of the economy. Today, among key interest groups and in some areas of policy making, non-market work is recognized as important for the supply of scarce goods and services in our society.

Consider, for example, the heavy reliance of Canada's hospital sector upon the services of volunteers. This is just one example of unpaid community support work that helps to maintain the stable social conditions required for effective functioning of markets. The unpaid work done by parents in bringing up children is another important part of the social infrastructure required for an effective society. The unpaid work done by children in providing assistance to their parents, or that done for needy adults (who may not be parents) by others who are also adults, is important in moderating pressures for state-financed support services.

Today, many companies can create their outputs with less labour than they used to need, and *new* labour-intensive industries are not emerging rapidly at this time. Non-profit organizations are increasingly seen as sources of possible assistance in providing retraining opportunities for displaced workers. The voluntary sector is also important in providing avenues for the useful application of the skills of those who cannot find paid work. (Already there are federal and provincial pilot projects in which limited income support is passed to unemployed persons in exchange for useful community support work.) These developments point to a "new" source of linkage between non-market work and the market economy – the dependence of the market upon non-profit organizations as safety valves in the process of adjustment to technological change.

The preceding observations suggest the following hypothesis: *work as measured in the conventional labour market survey is too narrowly conceived*

*to support some of the "new" public debates and policy deliberations about the functions of work in our economy or the access of individuals to opportunities to perform valuable services.*

These public policy debates address issues in the following areas:

- *The market.* A good deal of the focus of men's time use upon market work is possible because women are disproportionately concentrated among the ranks of those who do the bulk of society's caring work. Even when men and women with full-time jobs are compared, the greater focus of women on caring work remains evident.
- *Communities.* The supply of unpaid community support work depends on the extent to which groups most likely to make that supply are also engaged in heavily time-consuming market work.
- *Families.* Families must cope with the problems that arise from their members' efforts to manage the tension that is created between the demands of their jobs and their familial obligations.
- *The groups among whom unpaid caring work is concentrated.* Those who spend large portions of their daily lives in family-caring work often hurt their prospects for income security in old age. The ones who also hold down full-time jobs often find that their access to opportunities for training and education are greatly constrained.
- *Building access to help in time of need.* Productive, though unpaid, work carried on by persons who have no paid job or business, can create a legitimate basis for their claims upon sources of assistance when they are in need.
- *Major recipients of the outputs of caring work, particularly children, a subset of the elderly, handicapped persons of all ages.* To the extent that those who do most of society's caring work increasingly spend time at paid work, there is a potential threat to the supply of vital caring work.

The classes of concerns mentioned above have one thing in common that deserves highlight. The issues cannot be explored by data and analysis that



deal only with market work, or only with paid work. *The issues require data that integrate information about time spent doing both paid work and unpaid work of economic value.* (The concept of “work of economic value” is defined in Chapter 1.)

Such data need to be designed to allow analysts to associate variations in levels of joint conduct of these two kinds of work with several population attributes. The pertinent attributes include sex, age, marital status, education, occupation, type of place of residence, and so on. Precisely such data are available in Statistics Canada’s Total Work Account System (TWAS), which is based on time use diaries collected in the General Social Survey.

In its most general sense, the phrase “total work” refers to the aggregate of both paid and unpaid productive work. In the TWAS this aggregate is viewed as having two primary components: (1) work with a well-defined output that is often used by persons other than those creating the output; and (2) personal investment work. The latter is also known as the investment use of time. Prime examples of the investment use of time are educational and many training activities.

The TWAS is used by extracting special tabulations or series of coefficients from its micro-level database. In addition, the TWAS can be used by applying statistical analysis routines to the records in that database. These uses would normally be made to provide support to particular analysis projects that are designed to yield information related to issues of public concern. Projects in any of the following areas can lead to requests for special tabulations or analyses that draw upon the TWAS:

- prevalence of child care activities across key sub-groups of men and women,
- volume and value of informal health care activities,
- implications of gender differences in the pattern of balancing of work and family obligations,
- pattern of time use while doing paid work or engaged in self-employment as a business operator,
- gender and occupational differences in time available for pursuing job-related education and training,

- inter-group differences in the volume of informal supports provided to adult household members and to adults who do not share persons’ homes,
- sub-group variations in blending of volunteer work for organizations with paid work and with family-oriented unpaid work, and
- patterns of sub-group differences in devotion of time to work of civic value.

*The TWAS should be regarded as being one of the satellites to the System of National Accounts (SNA, 1993 version).* The official statement of principles for the 1993 version of the SNA explicitly envisages satellite accounts that may use alternative classification systems, may employ physical measures (instead of money) as the central unit of accounting, and may even change the production boundary that has been established for the central portions of the system (see United Nations 1993, Chapter XXI).

In its conception of alternative designs for satellite accounts, the official statement of principles for the 1993 version of the SNA removes the major barrier that prevented TWAS from being regarded as a satellite under previous versions of the SNA. In previous versions, this barrier was the requirement of full linkage of the monetary valuations in the satellite with pertinent parts of the central SNA. The 1993 version now allows for only partial linkage.

A simple example of this idea is the following. Suppose you change the production boundary, in the process of building a satellite account, to include services offered by one household member to another as well as volunteer work (this precise example is cited on page 491 of the official statement of principles of the SNA). If you proceeded to derive a monetary value for those services, a portion, at least, of that value cannot be fitted into the central (market-oriented) sections of the SNA. The value cannot be fitted precisely because it deals with services that lie outside the declared production boundary for those central sections. Thus, TWAS could not, as matter of principle, be regarded as being a satellite of the SNA *prior* to the 1993 version of the SNA.

The 1993 version now explicitly allows satellites to establish production boundaries that are meaningful for their own primary purposes. The limitation imposed is that activities that fall within



both the satellite and the main SNA should not have conflicting monetary valuations in the two systems. For example, the aggregate remuneration paid to employees should be a common value between paid work covered in the TWAS and that covered in the main SNA. This is easily achieved once the underlying volumes of paid work, by occupation and industry, are harmonized between the SNA and TWAS.

Hence the development of the TWAS should be regarded as part of Statistics Canada's work in implementing the principles and spirit of the revised SNA.


The purpose of this book is to introduce the Total Work Accounts System. This book presents the principles that underlie the design of the TWAS, some conceptual questions raised in executing that design, the system's major components, and a number of its possible uses. This information is covered in the six chapters that follow.

- Chapter 1 introduces some key features of the general structure of the TWAS. It also briefly discusses conceptual questions raised in constructing the TWAS and in carrying out estimation work using available data.
- Chapters 2, 3 and 4 present the major components of the TWAS. These are the central table or core matrix and its underlying micro-data file, the network of auxiliary tables, and derived statistical indicators.
- Chapter 5 provides an illustrative application of TWAS concepts. It deals with aspects of time use by the unemployed, including correlates of educational attainment. The focus of the study of time use by the unemployed is upon the extent of their total productive work, including time spent in educational activities.
- Chapter 6 is a wide-ranging survey of possible fields of application of TWAS concepts and data. The survey considers both questions of interest to researchers as well as issues of public policy making and debate.

Many persons have made significant contributions to the development of the TWAS and to the contents of this book. Concerning contributions to the development of the TWAS, Hans Adler,

Ivan Fellegi, Andrew Harvey, Ian Macredie, Judith Maxwell, Michael McCracken, Paul Reed, Ian Stewart, Stewart Wells and Martin Wilk have provided important criticism, support and encouragement. Frank Jones, author of Chapter 5 in this book, deserves special thanks for his many contributions to the definition of indicators cited in Chapter 4, and for his detailed critique of the computing algorithm used to generate the core table of TWAS. K.G. Basavarajappa, Marie Beaudet, Gordon Bulmer, Marjorie Hansen, Catherine Pelletier, Tania Saba and Tim Werschler helped improve the text paper in many ways. Sharron Smith deserves thanks for her work on the charts and tables, and for graphic design of this book.

*Leroy Stone  
Marie-Thérèse Chicha  
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## Highlights

- Many important issues of public concern require data that integrate information about time spent doing both paid work and unpaid work that has economic value. Such data are available in Statistics Canada's Total Work Account System (TWAS), which is based on time-use diaries collected in the General Social Survey.
- The Total Work Account System is a network composed of a microdata file, concepts, linked statistical tables, and statistical indicators that can be used to provide information pertinent to major issues in fields of public concern and policy debate. In addition, the microdata file or the detailed tables can provide bases for analyses and modelling of impacts of important social and economic developments on the availability and utilization of paid and unpaid work outputs. Examples of such outputs are child care or elder care services.
- The statistical indicators discussed include the following: Work Load Index (WLI); Weighted Unpaid Work Output Index; Unpaid Work Intensity Index; Weighted Paid Work Output Index; Paid Work Intensity Index; Adult-Support Ratio, a measure of proportion of time budgets used in providing unpaid work on behalf of organizations; and a measure called "Total Work Output Recipient" for a specific class of recipients such as children.
- The groups with the highest values on the Work Load Index are:
  - women aged 20 to 44 years, with spouse and at least one preschool-age child at home, working full time: WLI = 46.7
  - women aged 20 to 44 years, with spouse and at least one other child (none of preschool age) at home, working full time: WLI = 45.1
  - men aged 20 to 44 years, with spouse and at least one preschool-age child at home, working full time: WLI = 45.0
  - women aged 45 to 64 years, with spouse and without children at home, working full time: WLI = 44.8

The figure of 46.7 cited above means that among married women aged 20 to 44 years who have at least one preschool-age child at home and a full-time job, close to one-half of each 24-hour day, on average, is spent doing work of economic value.
- Women managers aged 20 to 44 with a spouse at home and a preschool child spent, on average, more than 11 hours out of their 24-hour time budgets doing work of economic value. If we add to those hours the time committed by paid work but in which work output is not taking place (for example, commuting time), we get an average of about 52% of the time budgets of these women as a group. The male counterparts of these women, as well as women managers with a non-preschool-age child at home, were significantly behind, with a figure of over 10 hours per person per day (on a seven-day week basis). There are small percentages of women managers with daily hours of work of economic value well above the averages just cited.
- Managers have a longer than average day on the job and spend a lower percentage, on average, of their paid work day having meal or rest breaks. Their average work day is approximately 40 minutes above the average for all full-time workers in 1992, 9.2 hours versus the global average of 8.5 hours (on a five-day week basis). Average times on the job were close to or above 10 hours for managers in Primary Industries other than Agriculture, Manufacturing of Non-durable Goods, Retail Trade, Personal Services and Public Administration. These figures exclude commuting time.
- In 1992, the groups that spent the greatest portions of their time budgets in child-oriented work were led by women aged 20 to 44 with a preschool child at home, but with no spouse at home and no full-time job. These women spent 39% of their time budgets, on average, in child-oriented work. The figure for their counterparts who did have a spouse at home was just slightly less at 36%. The next highest groups were women aged 20 to 44 who did have full-time jobs. For those with no spouse at home the figure was 26% in 1992. It was 24% for those who did have a spouse at home.

- For those who had a preschool child at home, two of the six leading groups, in terms of time spent doing child-oriented work, were composed of men. Both groups of men were aged 20 to 44, had a spouse and a preschool child at home. One of the groups did not have a full-time job, and they spent 22% of their time budgets, on average, in child-oriented work in 1992. Their counterparts, who did have full-time jobs, spent 16% of their time budgets, on average, in child-oriented work in 1992.
- When age *and several* other variables are held constant, the holders of college degrees tend to spend the most time, for both work of economic value and for total productive activity, compared with the other education groups. Among those without degrees, those without high school education did not show a tendency to spend less time in productive activities than those with high school education, holding several other factors constant, according to the regression results. This observation suggests the *hypothesis* that having or not having a high school diploma is not the key work-output-related discriminator. The key one seems to be having or not having a college degree.
- The data suggest the hypothesis that offering the unemployed enhanced educational opportunity is unlikely to lead to reduction in the average time they spend meeting obligations for unpaid work of economic value, such as many forms of family support. However, many who already have major family support obligations may have great difficulty finding the time to make use of educational opportunities unless the latter are designed in family friendly ways. This remark probably applies with even greater force to the employed who need educational upgrading. *An important feature of the TWAS is that it is the only national labour accounting system in Canada that allows these issues to be explored when full account is taken of a person's obligations to provide unpaid work outputs in support of their families and communities.*

## Chapter 1

# Introduction and Conceptual Issues

## 1.1 Purposes of TWAS

The Total Work Account System (TWAS) is a network comprised of a microdata file, concepts, linked statistical tables, and statistical indicators. Its principal concept involves three ideas: (1) there is a flow of work outputs that have economic value, (2) the sources of the outputs are defined sub-groups of population, and (3) the destinations of the outputs are other sub-groups of population as well as organizations. The TWAS tables are designed to facilitate the computation of key indicators that can be used to provide information pertinent to major issues in fields of public concern and policy debate. In addition, the microdata file or the detailed tables can provide bases for analyses and modelling of impacts of important social and economic developments on the availability and utilization of paid and unpaid work outputs. Examples of such outputs are child care or elder care services.

TWAS data can be used to address many issues that arise from the integration of paid and unpaid work in the lives of individuals. Of particular concern is the vast amount of work of economic value that takes place outside paid labour markets. The systematic measurement of all work of economic value is becoming urgent. Already there are public debates concerning benefits to which persons may be entitled because of the economic value of their unpaid work outputs. Topics covered in the debates include pensions for home managers and income supports for unemployed persons who perform valuable community services.

Three observations point to the motivation for the development of the Statistics Canada Total Work Accounts System:

- (1) *Work that creates wealth* in our society goes far beyond what is measured in conventional labour market oriented surveys.
- (2) A strong *inter-dependence between market and non-market work* makes it difficult to

understand the pattern of the market work using only labour force data. The need for this understanding has become very important because of the major participation of women in paid work outside their homes.

- (3) Some *major issues being considered in current Canadian public policy debates* require explicit recognition of the need to treat work measured under the labour force concepts as a subset of a larger volume of work of economic value.

The design of the TWAS goes beyond portrayal of the patterns of flow of work from population groups to sectors of the total economy. TWAS includes data structures and computational procedures that help analysts deal with the question of *how the work outputs arise or take on certain patterns*. For example, the tendency of a population group to be engaged in particular kinds of work may depend upon its educational composition. To portray and analyze aspects of the educational composition observed for a population group, TWAS preserves education variables on its microdata file, and provides for the inclusion of education among its set of linked tables. Changes in tendencies to carry on certain kinds of work could be the result of the pattern of transition or mobility among educational categories. This matter is covered in the TWAS' network of linked tables.

The TWAS' master file requires the merging of the person-oriented and event-oriented files that arise from the typical survey that collects time use diaries. Time use diaries were collected in the General Social Surveys (GSS) of 1986 and 1992.

The General Social Survey is a national sample of the population aged 15 years of age and older. Excluded from the sampling universe are residents of the Yukon and Northwest Territories, households without telephones, and full-time residents of institutions. Relative to the total population, these are tiny subgroups.

The 1992 GSS collected time use diaries for more than 9,000 Canadians. All interviewing for the GSS was by telephone, with probability sampling used to draw the numbers called. The GSS employs Random Digit Dialling sampling techniques.



The microdata files arising from for 1992 GSS contain weight variables that allow estimates to take into account the sampling design. The figures and charts shown in this book are based on the weighted data. *With these weights, the data can be said to be representative of the Canadian private household population.*

For various applications, the TWAS' master file can be augmented by means of stochastic imputation of values for new variables based on information contained in the files of other Statistics Canada surveys. This file augmentation will allow the creation of new classes of linked tables that extend subject coverage of the TWAS. For example, a new variable has been imputed based on information contained in the 1990 General Social Survey. This was done in order to allow detailed exploration of aspects of the help given to the elderly by their informal support networks, and of the return of help from the elderly to their children.

## 1.2 Key Variables of the System

The fundamental variable of the TWAS is called "*total productive work*". This concept is based partly on the writings of Harvey and his colleagues (see Harvey, Marshall and Frederick 1991 and Harvey, Elliott and Macdonald 1983). In the TWAS, total productive work has two components: (1) "*work of economic value*" and (2) "*personal investment work*".

For the purposes of the TWAS, "work of economic value" means work whose output can be purchased in the paid labour market. This concept is intended to include non-market work, as well as that normally measured in a labour force survey. This definition relies upon Hawrylyshyn's "third party criterion" (see Hawrylyshyn 1977 and Adler and Hawrylyshyn 1978). According to the third party criterion, an activity is deemed economic when it can be executed by a person other than the one who benefits from it. In other words, the producer and consumer can be distinct and the distinction can lead to a transaction in a market.<sup>1</sup>

For the purposes of the TWAS, "personal investment work" means an activity that is

undertaken for the purpose of improving one's perceived human capital, or for the purpose of locating a new opportunity such as a new source of income. The output of personal investment work is always used by the person doing the work, it may not be identifiable by a second party, and hence may not be saleable in any labour market. Training and educational activities are often examples of personal investment work.

The definitions just given are of little use when different kinds of productive activity (e.g., work at a paid job, child care, education) must be classified. Such classification requires operational definitions, in contrast to the connotative definitions just presented.

In the case of work of economic value, the *precise* operational definition is implied by the algorithm that is programmed in computer software used to classify detailed activities as they are coded on a microdata file. However, a loose and very general operational definition follows. (A more detailed version is presented in Appendix A.)

Work of economic value (WEV) exists if the activity is of a kind that creates an *identifiable output*, consumers of the output can be identified by the analyst, and the consumption may be reasonably deemed (by the analyst) to have utility for the consumers. In creating the classification algorithm for the TWAS five different classes of possible consumers were envisaged:

- (1) there is a readily identified person who is the primary consumer of the output who is not the doer of the work (e.g., various aspects of child care, elder care);
- (2) there is no readily identified primary user of the output and almost all the users of the output reside away from the doer (e.g., unknown persons receiving services that appear to come from businesses or other organizations);
- (3) other members of the doer's household who consume the work output in a context that makes it impossible to identify a primary consumer (e.g., services relating to meal preparation, laundry, house cleaning);
- (4) the doer of the work is also the primary user of the output and the output would have to be 'purchased' from another party if the doer was unable to do the activity;

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See end notes at the end of the publication.

- (5) persons or other entities within an organization (e.g., work done as part of a paid job).

In the case of personal investment work, the operational definition is as follows. Personal investment work is an activity that is deemed to have the potential to increase the human capital of the person carrying on the activity, or one that involves search for new opportunities that have the potential to increase the person's income. The output of this work must be consumed by the person doing the work, and normally cannot be supplied by another person.

The representation of the operational definition of personal investment work in the context of computer software is considerably simpler than in the case of work or economic value. One simply looks for activities that probably involve educational and training effort, among the detailed list of activities that arises from a time use diary. An example is the set of activities selected in Chapter 5 to represent time spent in education.

### 1.3 Selected Conceptual and Measurement Issues

*Relevance of the worker's intentions.* Relevance of the worker's intentions. The adopted definition of "work of economic value" places a focus upon the result of work, rather than on the subjective intentions of the person deemed to be making the effort. If the activity is deemed by an observer to produce an output that has utility to an identifiable consumer of the output, and is of economic value, then the activity should be measured as a case of work of economic value in the TWAS irrespective of the intentions of the person doing the work.<sup>2</sup>

*Use of a weak proxy for work output.* Relevant work activities can have different forms and the resulting outputs may not be measurable on the same scale. Tutoring your child during a homework session is so different from preparing a meal that ideal measurement of work outputs should provide for different scales to cover these two kinds of activity. Ideally, statistics would include transformations that serve to integrate information from the different scales that might be built.

See end notes at the end of the publication.

Limitations in available data require us to use time spent on an activity as the integration device. The result is that the data shown below measure work flows in terms of volumes of work input applied by selected socio-demographic groups. Such data are essential for addressing some of the issues that arise when we observe the effects of the integration of paid and unpaid work. They should, however, be supplemented by other data that more directly reflect the results of the work inputs.

The use of time spent on an activity arises from the fact that we are restricted to data arising from conventional time use surveys. In these surveys, there has been little effort to measure *results* of work activities. Also there has been little effort to identify clearly the consumers of some outputs of those activities. However, more active attention to the policy issues that surround unpaid work should eventually lead to survey questions more suited to the kind of information the TWAS is being designed to generate.

*Handling of secondary activities.* One of the key issues of database design in the field of time use measurement relates to the recognition and handling of so-called secondary activities. In any given time slot of substantial length, two or more activities may be underway. Two or more work outputs might be achieved by one person from activities undertaken within a time slot of several minutes in length. The person then may have difficulty deciding which to cite as the activity that was going on in the time slot. If he or she reports both activities in a time use survey, the activity classification system may cause one of them to be lost from the database. If both are kept in the database and the time slot is not partitioned in allocating time to each activity, the person's day will seem longer than 24 hours. However, no problem should arise with properly constructed indices that allow two or more activities that cover the same time period to be weighted by some appropriate measure of time spent.

*Measurement and valuation.* In theory, at least, dollar valuation can be placed on all work of economic value, though the technique and validity of valuation may be obscure and/or controversial (see, e.g., Chicha-Pontbriand 1983). In any event, since dollar valuation is being pursued in another



part of Statistics Canada, it will not be attempted in TWAS's estimation work (see Jackson 1992, Chandler 1994, and Statistics Canada 1995).

Dollar valuation is not the only valuation that matters. The perceived value of unpaid work, from the viewpoint of both the doer and the recipient, is often a non-monetary kind of value. Difficult as that may be to measure statistically, the effort to do so is worthwhile.

In short, there is a variety of ways of approaching measurement of WEV. In so doing, different kinds of units of measurement are pertinent. The set of numeraires that could be used in a system of tables like the TWAS includes the following:

- Units that measure amounts of personal time spent doing work of economic value;
- units that measure numbers of events of specific types involving the doing of work of economic value (e.g., number of times that father helped child with homework from school during the past month, irrespective of whether the father was conscious of doing two different things at the same time during these occasions);
- units that measure the monetary value of work of economic value;
- units that measure some other non-monetary value of work of economic value (e.g., a person's position on a standardized scale of things he/she would be willing to give up in order to avoid losing the benefits of a specific work output that he/she consumes regularly).

As new data become available, the tables in the TWAS will use a variety of numeraires, the primary one being a unit of personal time.

## Chapter 2

# Core of TWAS's Structure

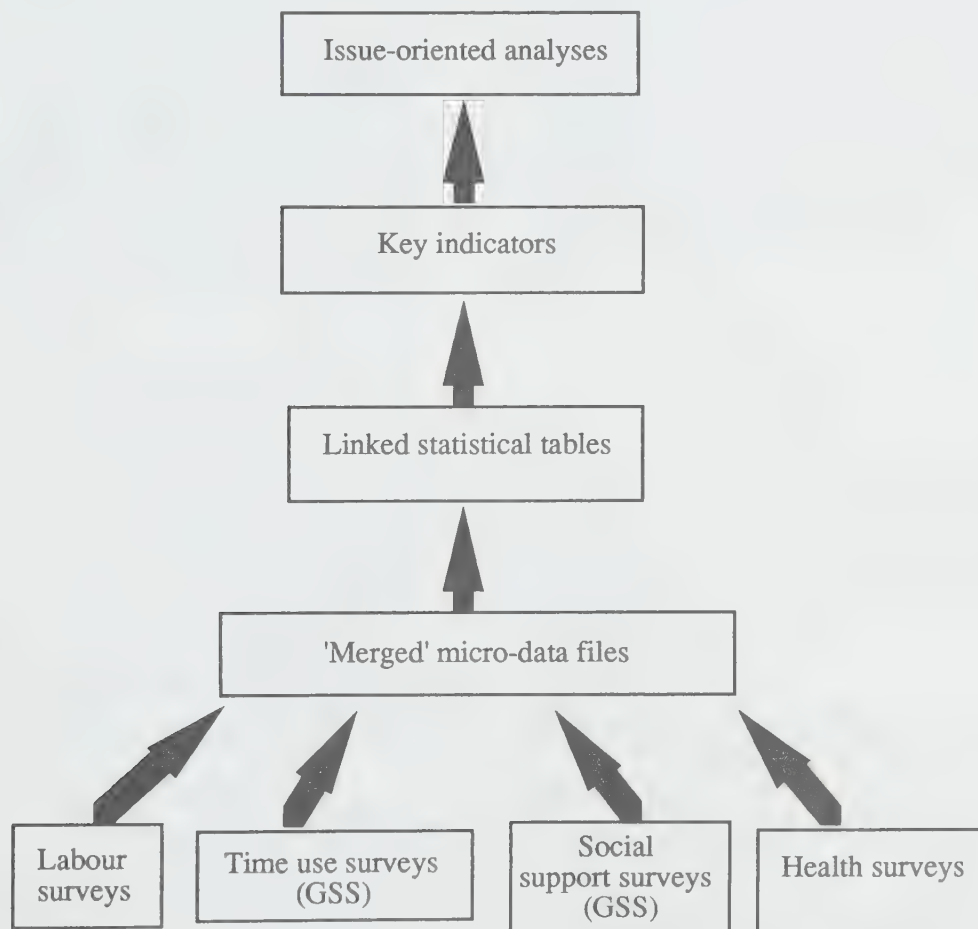
## 2.1 General Structure of the System

Figure 2.1 illustrates key aspects of the design of the TWAS. Linked statistical tables and key indicators rest upon a database comprised of merged micro-data files. These files are in turn derived from Statistics Canada surveys. The indicators, the linked tables and the merged micro-

data files comprise the TWAS. Applications of TWAS data are comprised of issue-oriented data analysis and modelling projects.

The next section will present some key features of the design of the TWAS. To be sure that a wide variety of readers will have a chance to understand those features, technical jargon such as “square matrices,” “vectors” and “transformation coefficients”, “pre-multiplication” and “post-multiplication” will be avoided wherever feasible. A table with numbers arrayed in a line, where it would be meaningful to represent each number as a percentage of the sum of all the numbers in the table, will be called a “simple distribution”.

Figure 2.1  
Total Work Accounts System





## 2.2 Design of the Core Table

At the core of the set of linked statistical tables is one that has two forms – a restricted form and an extended form. The restricted form contains measures of flows of work output from designated socio-demographic groups to defined destinations. The latter are comprised of categories of persons or of organizations that are relevant to enduring public policy issues and government programmes. The sum of the measures in any one line of the restricted form yields an estimate of the total work of economic value (as defined above) for the specific population group that is the *source* of all that work. For this reason a table with the restricted form may be called below either “restricted core table” or “WEV (work of economic value) table”.

The extended form of the core table (henceforth called the “extended core table” or “total productive work” table) includes the restricted form and adds a number of columns that represent additional productive activities done by the population groups that are represented in the lines of the table. Two important sets of activities may be cited with regard to these additional activities. The first are time uses that are required (or entailed) by the effort to perform work of economic value. An example here is travelling to and from the place where one does paid work (see, e.g., the comment about Destination 10 in

Appendix A). Another set of activities is comprised by the investment uses of time, e.g. educational and training activities.

Because of the difficulty of fitting many of the additional activities just illustrated into a discussion where central importance is accorded to the notion of a *flow of work outputs from a designated source to a designated destination*, we are limiting illustrations of use of the extended core table primarily to Chapter 5. However, elements of the extended core table that fall outside the WEV table are used in the construction of key statistical indicators which are discussed in Chapter 4.

The two lines of data in Text Table A below are an illustrative extract from the restricted core table for 1992.

Each number in the lines above is an estimated average number of hours of work of economic value per person per day in a seven-day work week. For example, consider the number 4.2, which is at the intersection of line 1 and column A. This figure is an estimated *average* number of hours of paid work done in 1992 for business per person per day in a seven-day work week. The estimate refers to women aged 20-44, who lived with a spouse and a preschool child, and who had a full-time job. Notice that although both groups

Text Table A  
Illustrative Extract from the Core Table

Source		Destinations			
		Paid work – business or government	Unpaid work – business and voluntary organization	Children	Other family friends, household, self
		A	B	C	D
Age 20-44, living with a spouse/partner, a preschool aged child and employed full time:					
Female	(1)	4.2 <sup>1</sup>	0.1	3.1	3.2
Male	(2)	5.9	0.0	1.4	2.5

<sup>1</sup> Hours per person per day, for a 7-day week.

of men and women were classified as having full-time jobs, men's hours of paid work were much greater than those of women. In contrast, the women's hours of unpaid work whose outputs were used primarily by children (3.1) greatly exceeded those of men (1.4).

### 2.2.1 Rows ('Origins' of Work Outputs)

Each line represents a population group that is regarded as being a source of work outputs received by the named destinations. As illustrated above, *many of these sources (population groups) have distinctive patterns of work output over the alternative destinations.*

The lines shown above were specially defined to identify men and women who probably had relatively high levels of work obligation arising from both paid jobs and from family ties. This is illustrative of the key idea behind the construction of rows (lines) for the core table. The aim was to identify population groups with varying degrees of responsibility arising from obligations involving paid work and family ties. In this text, the groups will be called "Job-Family Obligations Groups" (for related discussion see Harvey, Marshall and Frederick 1991 and Harvey, Elliott and Macdonald 1983, Stone 1994). Many of these groups are of direct concern for the development of public policies about the promotion of family and community supports and about the supply of labour in the economy.

The master list of Job-Family Obligations Groups is shown in Table 2.1. A total of 76 possible Job-Family Obligations Groups have been named, based on categories coded for the selected variables on the 1992 GSS database. The variables that serve as indirect indicators of family obligations focus on the presence in the home of young children of the respondent, or on the presence of parents in the home for respondents who were not living with a spouse or partner. Unfortunately, the presence of parents in the home for respondents who were living with a spouse or partner cannot be ascertained in the database used.

It is understood that the possible existence of family obligations ought not to be examined by merely considering a person's living arrangement.

Moreover, indicators based on living arrangement can give faulty signals, as in the case when the parent in the home is more a source of support to the respondent than one of obligations. The indicators used in Table 2.1 are the best available means of gauging where respondents might have family obligations that influenced the amount and pattern of their work outputs.

Spouses are, of course, major sources of both family obligations and family support. The presence of a spouse or partner in the home is one of the variables used to construct the key Job-Family Obligations Groups. Groups comprised of persons who live alone are also separately identified.

Although the preceding text refers to specific variables that will be used in the construction of rows of the core table, in any particular implementation of the concepts *different variables might be used*. This flexibility is available because the statistical tables are always retrieved from the micro-data files that form part of the TWAS. This data source also *allows the categorization of any of the variables to be changed* without damaging the integrity of the system. For example, age might be broken down into more detailed categories.

### 2.2.2 Columns ('Destinations' of the Work Outputs)

The destinations represented in the columns of the core table have been constructed to facilitate the production of data pertinent to public policy concerns in such fields as market work, social support and health promotional activities. The set of four destinations used for the illustrative data shown above is the result of aggregations among nine possible destinations that may be found in the WEV table (see Table 2.2). Each column of the table represents a category of recipients of work outputs.

Taking into account the limitations of the 1992 General Social Survey database, nine classes of destinations have been set forth for estimating the WEV table. They are as follows:

- (1) Business (excluding Community Services), paid work
- (2) Government and Community Services, paid work



Table 2.1  
Job-Family Obligations Groups, Canada, 1992

Category No.	Age group	Sex	Living arrangement 1	Living arrangement 2	Employment	Persons '000s	Relative frequency %
<b>Key groups</b>							
1	20-44	Female	Living with a spouse/partner	Preschool child at home <sup>1</sup>	Employed full time <sup>2</sup>	427	2.0
2					Not employed full time	785	3.7
3				Other children at home <sup>3</sup>	Employed full time	781	3.7
4					Not employed full time	663	3.1
5				No children aged <19 at home	Employed full time	649	3.0
6					Not employed full time	319	1.5
7		Male	Living with a spouse/partner	Preschool child at home	Employed full time	1049	4.9
8					Not employed full time	177	0.8
9				Other children at home	Employed full time	964	4.5
10					Not employed full time	128	0.6
11				No children aged <19 at home	Employed full time	701	3.3
12					Not employed full time	158	0.7
13		Female	Living with others	Preschool child at home	Employed full time	54	0.3
14					Not employed full time	103	0.5
31	45-64	Female	Living with a spouse/partner	No child at home	Employed full time	492	2.3
32					Not employed full time	1058	5.0
35		Male	Living with a spouse/partner	No child at home	Employed full time	866	4.1
36					Not employed full time	469	2.2
45		Female	Living alone		Employed full time	144	0.7
46					Not employed full time	210	1.0
47		Male	Living alone		Employed full time	168	0.8
48					Not employed full time	134	0.6
<b>Other groups</b>							
15	20-44	Female	Living with others	Other children at home (no parent)	Employed full time	160	0.8
16					Not employed full time	135	0.6
17				Parent at home (no children) <sup>4</sup>	Employed full time	271	1.3
18					Not employed full time	227	1.1
19		Male	Living with others	Preschool child at home	Employed full time	4	0.0
20					Not employed full time	19	0.1
21				Other children at home (no parent)	Employed full time	36	0.2
22					Not employed full time	6	0.0
23				Parent at home (no children)	Employed full time	487	2.3
24					Not employed full time	384	1.8
25		Female	Living alone		Employed full time	249	1.2
26					Not employed full time	129	0.6
27		Male	Living alone		Employed full time	467	2.2
28					Not employed full time	155	0.7
29	45-64	Female	Living with a spouse/partner	Child at home	Employed full time	234	1.1
30					Not employed full time	297	1.4
33		Male	Living with a spouse/partner	Child at home	Employed full time	636	3.0
34					Not employed full time	277	1.3

See footnotes at the end of the table.

Table 2.1  
Job-Family Obligations Groups, Canada, 1992 – Concluded

Category No.	Age group	Sex	Living arrangement 1	Living arrangement 2	Employment	Persons '000s	Relative frequency %
<b>Other groups</b>							
37	45-64	Female	Living with others	Children at home (no parent)	Employed full time	31	0.1
38					Not employed full time	52	0.2
39					Employed full time	8	0.0
40					Not employed full time	7	0.0
41	Male	Male	Living with others	Children at home (no parent)	Employed full time	23	0.1
42					Not employed full time	19	0.1
43					Employed full time	15	0.1
44					Not employed full time	0	0.0
49	20-64	Female	Not living with a spouse/partner	Parent and children at home	Employed full time	5	0.0
50					Not employed full time	22	0.1
51					Employed full time	0	0.0
52					Not employed full time	39	0.2
53	65+	Female	Living with a spouse/partner	Child at home	Employed full time	2	0.0
54					Not employed full time	76	0.4
55					Employed full time	17	0.1
56					Not employed full time	666	3.1
57	Male	Male	Living with a spouse/partner	Child at home	Employed full time	16	0.1
58					Not employed full time	116	0.5
59					Employed full time	96	0.4
60					Not employed full time	684	3.2
61	Female	Female	Living with others	Child at home	Employed full time	0	0.0
62					Not employed full time	17	0.1
63					Employed full time	1	0.0
64					Not employed full time	165	0.8
65	Male	Male	Living with others	Child at home	Employed full time	1	0.0
66					Not employed full time	6	0.0
67					Employed full time	5	0.0
68					Not employed full time	55	0.3
69	Female	Female	Living alone	No child at home	Employed full time	20	0.1
70					Not employed full time	740	3.5
71					Employed full time	15	0.1
72					Not employed full time	284	1.3
73	All others	Female	Living alone	No child at home	Employed full time	438	2.1
74					Not employed full time	1221	5.7
75					Employed full time	563	2.6
76					Not employed full time	1194	5.6
					TOTAL	21296	99.90

1 "Child" means at least one child of the respondent aged less than 19.

2 The time reference of "employed full time" is the week prior to the survey "Employed" includes persons self-employed.

3 "Other children" means at least one child but excluding any of preschool age.

4 "Parent" means at least one parent. Where a person is coded as living with a spouse/partner, the data do not permit one to ascertain whether any parent is in that home.  
Source: 1992 General Social Survey microdata files (Statistics Canada).



Table 2.2

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work		Unpaid work for business	Volunteer work for organizations
			Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>		
			A	B	C	D
<b>Age 20-44</b>						
<b>Living with a spouse/partner and</b>						
A preschool child of respondent at home:						
1	Employed full time	Female	2.8	1.4	0.1	0.0
7		Male	4.9	1.0	0.0	0.0
2	Not employed full time	Female	0.2	0.3	0.1	0.1
8		Male	0.4	0.4	0.2	0.0
A child of respondent (above preschool age) at home – no preschool child of respondent at home:						
3	Employed full time	Female	2.7	1.9	0.0	0.1
9		Male	5.3	0.7	0.1	0.1
4	Not employed full time	Female	0.4	0.4	0.0	0.1
10		Male	0.2	0.0	0.0	0.0
No child of respondent at home:						
5	Employed full time	Female	3.6	2.0	0.0	0.0
11		Male	4.8	1.4	0.0	0.0
6	Not employed full time	Female	0.6	0.3	0.1	0.1
12		Male	0.6	0.4	0.0	0.0
<b>Living with others (no spouse/partner at home)</b>						
A preschool child of respondent at home:						
13	Employed full time	Female	3.3	0.8	0.0	0.4
14	Not employed full time	Female	0.4	0.0	0.0	0.0
<b>Age 45-64</b>						
<b>Living with a spouse/partner</b>						
No child of respondent at home:						
31	Employed full time	Female	3.1	2.1	0.2	0.0
35		Male	4.8	1.2	0.1	0.1
32	Not employed full time	Female	0.3	0.2	0.1	0.1
36		Male	0.1	0.0	0.0	0.2
A child (aged less than 19) of respondent at home						
		Female	1.4	1.4	0.1	0.2
		Male	3.4	1.1	0.1	0.1
<b>Living alone</b>						
No child of respondent at home:						
45	Employed full time	Female	2.4	2.4	0.0	0.0
47		Male	4.1	1.4	0.0	0.0
46	Not employed full time	Female	0.0	0.1	0.0	0.5
48		Male	0.0	0.0	0.0	0.2

See footnotes at the end of the table.

Table 2.2  
**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
E	F	G	H	I	J	
0.6	3.1	0.1	0.1	2.4	10.5	1
0.6	1.4	0.1	0.1	1.7	9.8	7
0.7	4.9	0.1	0.2	2.8	9.3	2
0.6	1.7	0.1	0.1	2.6	6.2	8
0.5	1.3	0.1	0.1	3.1	10.0	3
0.6	0.6	0.0	0.1	1.9	9.2	9
0.8	1.9	0.2	0.2	4.0	8.0	4
0.9	0.7	0.0	0.2	2.5	4.4	10
0.7	0.0	0.1	0.0	2.6	8.9	5
0.7	0.0	0.1	0.1	1.8	8.9	11
1.1	0.2	0.3	0.2	4.0	6.8	6
0.7	0.0	0.1	0.3	1.9	4.0	12
0.0	2.9	0.0	0.4	1.7	9.5	13
0.0	5.1	0.2	0.2	2.6	8.6	14
0.6	0.1	0.2	0.1	3.3	9.8	31
0.4	0.0	0.0	0.1	2.0	8.7	35
1.2	0.2	0.2	0.2	4.1	6.6	32
0.9	0.2	0.0	0.1	3.0	4.6	36
0.6	1.0	0.2	0.2	3.9	8.9	
0.6	0.3	0.0	0.1	2.6	8.3	
0.0	0.0	0.2	0.3	3.5	8.7	45
0.0	0.0	0.1	0.3	2.2	8.0	47
0.0	0.1	0.3	0.4	4.0	5.5	46
0.0	0.0	0.0	0.2	3.7	4.2	48

See footnotes at the end of the table.



Table 2.2

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Job-family obligations group <sup>2</sup>		Paid work		Unpaid work for business	Volunteer work for organizations
		Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>		
		A	B	C	D
<b>Age 20-64</b>					
<b>Living with others (no spouse/partner at home)</b>					
A child (aged less than 19) of respondent at home <sup>9</sup>	Female	1.7	0.8	0.0	0.0
	Male	2.5	1.0	0.0	0.3
A parent of respondent at home	Female	2.9	0.8	0.0	0.0
	Male	3.5	0.5	0.0	0.1
<b>Age 65 and over</b>					
Living with a spouse/partner – no child of respondent at home	Female	0.1	0.0	0.0	0.1
	Male	0.5	0.1	0.1	0.2
Living with others (no spouse/partner or child of respondent at home)	Female	0.0	0.0	0.0	0.1
Living alone – no child of respondent at home	Female	0.1	0.0	0.0	0.2
	Male	0.4	0.0	0.1	0.0

Table 2.2

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day
E	F	G	H	I	J
0.0	2.4	0.1	0.3	3.2	8.5
0.0	1.8	0.3	0.0	2.3	8.1
0.0	0.1	0.4	0.3	2.4	7.0
0.0	0.0	0.1	0.3	1.4	5.9
1.5	0.1	0.2	0.1	3.9	6.0
0.9	0.0	0.1	0.2	2.6	4.8
0.0	0.7	0.3	0.0	3.9	5.0
0.0	0.0	0.2	0.2	3.9	4.7
0.0	0.0	0.1	0.2	3.4	4.2

<sup>1</sup> Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1 for the detailed category level and its relative frequency in the population. The hours shown in a line pertain to work-related episodes allocated to one specific group as the 'source'.

<sup>2</sup> Production of these data requires merging records among the three 1992 GSS public-use files. Hours are calculated by taking each work-related time-use episode and weighting it both by the duration of the episode and the respondent's time-weight. Within the Episode File, multiple occurrences of the same type of episode are added and the respondent time-weight is used only once for the aggregate of those occurrences. All numbers in this table are time-weight as explained above, and will not equal totals computed from the Summary File, which uses a different respondent weight.

<sup>3</sup> All industries excluding government and the community services.

<sup>4</sup> Government and the community services industry groups.

<sup>5</sup> Work outputs reasonably allocated at least in part to the spouse, based on the content of the activity and contact with the spouse during the activity. However, many of these outputs would have been used by other household members as well.

<sup>6</sup> Activities included here go well beyond what the respondent specifically reported as being child care. Other work activities are allocated here based on the content of the activity and contact with the child during the activity. However, some of these outputs would have been used by other household members as well.

<sup>7</sup> This destination includes some persons that are NOT in the respondent's household. Also, where household members are involved, some outputs destined in part to them are covered in portions of the figures shown in columns E, F, H and I. The data source does not allow these portions to be disentangled without a set of assumptions considerably more elaborate than that being used here.

<sup>8</sup> Work outputs reasonably allocated at least in part to the respondent (the respondent both does the work and consumes the output), based on the content of the activity and reported contact with no one during the activity. However, many of these outputs would have been used by other household members as well.

<sup>9</sup> The lines for age group 20-64 sometimes include data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).



- (3) Business, unpaid work
- (4) Voluntary organizations
- (5) Spouse alone or spouse and other household members
- (6) Child alone or child and other household members
- (7) Adult family member and other household members
- (8) Other relative, friend or neighbour
- (9) Self alone or self and other household members.

Some pairs among these categories are not mutually exclusive in principle. However, in practice, the computer software used to execute the classification, treats the categories as if they form a hierarchy. An activity that satisfies a category at a given level of the hierarchy is not available to be classified again at a lower level. Position in the hierarchy is shown by the numbers used in the list of destinations above. For example, an activity that takes place in the presence of a spouse and which probably involves work whose output used by the spouse will be placed in the set of spouse-oriented activities (destination 5 cited above). That activity is not available to be placed in another class, e.g., Class 6, even if another person, e.g., a child, was also present when the activity was being carried on.

The frequent reference above to “other household members”, arises because the available data sometimes provide ambiguous indications as regards the identities of the recipients of work outputs. Often these data only identify persons who were present while the respondent was doing an activity. The use of this identification in the present work may produce misclassification errors. This can arise when persons with whom the respondent was in contact while doing an activity may have been *helping* the respondent to carry out the activity. Due to the uncertainty about the field of direct impacts of many of the activities, it is often appropriate to refer to “other household members” as being among the recipients of several of the work outputs. For example, many of the outputs that are used by the doer of the work or by her/his spouse would also be used (received) by other household members.

In the WEV table, no effort is made to get inside the household and somehow distribute parts of a

given work output among particular household members. This matter is addressed in connection with one of the auxiliary tables of TWAS (these are discussed below).

The identification of destinations shown above was strongly influenced by the following principle and classification of kinds of work output. The work, which produces the types of service or goods needed by individuals, families, other groups and organizations in a society may be grouped into the following broad classes:

- paid market work,
- unpaid market work,
- personal support work for self, family and friends,
- unpaid facilities maintenance work (e.g., home maintenance),
- unpaid community support work.

Juster et al. 1985, gives a classification that provides a breakdown of these main types of time use.

The classification of kinds of work just given lead to the conclusion that the separation of unpaid work is important. This conclusion lead to the third class shown above – unpaid work for business. Thus Classes 3 through 9 of the list above are comprised almost entirely of unpaid work.

The designation of separate destinations relating to spouse, child, other family members, etc., has been stimulated by the results of research done in the field of informal social supports. A considerable body of theory and empirical work has now been accumulated about informal social supports exchanged among individuals and families (see, e.g., Stone 1988 and references therein, as well as Stone and DeWit 1991, Stone 1992, Stone and Fletcher 1992). *This work repeatedly traces lines of support in ways that frequently disregard boundaries set by households* (e.g., flows of support between parents and children who do not share the same dwelling).

When a single person is viewed as being a node for reception or delivery of supports, the following have been repeatedly shown to be the major sources/destinations of supports: spouse (if married and living with the spouse), children, parents, friends, neighbours and other relatives. Depending on the kind of support being

considered, there tends to be a definite hierarchy among these groups in terms of their relative importance. For the major area of emotional supports, spouses, where present, and friends are most often at the top of the hierarchy (this does not mean *all* spouses or friends provide emotional support). For the area of instrumental supports, spouses, where present, children and parents (in that order) are at the top of the hierarchy. One of the most important innovations of the research in this field has been the reduction of emphasis on the group that occupies a single dwelling unit (i.e. the household) in the analysis of lines of support.

### 2.2.3 Contents of Each Row

As shown in the two lines of illustrative data above, the cells in one row of the core table contain estimated functions of the distribution of one Job-Family Obligations group's work outputs over alternative classes of recipients (destinations). The values of the functions are expressed in terms of average hours spent per person, over a given day, providing work outputs. For example, a single row might show hours spent providing unpaid care to children, unpaid care to adults, services at a job in a business, volunteer work for an organization, etc. (See Table 2.2 for details.)

This means that the available statistic actually measures work inputs (time spent preparing the work outputs). Here the distribution of the inputs over alternative destinations is regarded as a statistical proxy for the distribution of a more suitable measure of the work outputs. The proxy is of course, subject to errors as a representation of the distribution of a measure of the work outputs.

Using all 76 Job-Family Obligations Groups named in Table 2.1, a full core table was estimated for Canadians living in private households in 1992. Table 2.2 is a portion of the full core table. Table 2.2 shows, with a few exceptions,<sup>3</sup> the Job-Family Obligations Groups each of which contributed at least 2% of the total number of episodes of work of economic value in 1992.

In order to make comparisons with data for 1986, an alternate version of the table for 1992 is needed. This is due to differences in activity-coding

procedures between the two surveys. Table 2.3 uses operational definitions for 1992 that maximize the 1992-1986 comparability of the data. Table 2.4 refers to 1986, and it uses operational definitions that are designed to implement the general concepts about the nature of each destination without any concern for comparability with the 1992 coding procedures. Thus, in order to make 1986-1992 comparisons, Tables 2.3 and 2.4 should be used.

## 2.3 How to Read and Use the Data in the Core Matrix

Table 2.2 integrates information about work outputs across a wide spectrum of paid and unpaid work. Only the first two of these destinations deals with paid work. The Job-Family Obligations Groups covered in this table are the major contributors to all kinds of work done in our society. Each line of Table 2.2 represents a separate Job-Family Obligations Group. The following paragraphs are designed to highlight selected variations shown in Table 2.2.

It is well-known that gender and family obligations strongly influence the pattern of work output across paid and unpaid work. The clear demonstration of this point in Table 2.2 is no surprise. The table does, in addition, provide one basis for concrete estimation of the specific degrees of concentration of each group's total output among different classes of users of the work output.

For example, by comparing Groups 1 and 7 in column F, one can see a statistical association of gender with proportion of work output devoted to child-oriented work for young persons that had preschool children and a full-time job – 3.1 hours per person per day, on average, for women versus 1.4 hours for men. This is, of course, the same data used in the illustrative Text Table A presented earlier.

By comparing Groups 1 and 3 in column F, one can see a statistical association of family obligation with proportion of work output devoted to child care for young women that had full-time jobs. The average is 3.1 hours per person per day for women who had a preschool child at home versus 1.3 hours for women who had a child at home but none of preschool age.

See end notes at the end of the publication.



Table 2.3

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992**

(Hours per person per day, 7 days per week, comparable to 1986 table)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>	Volunteer work for organizations
			A	B	C
Age 20-44					
Living with a spouse/partner and					
A preschool child of respondent at home:					
1	Employed full time	Female	2.8	1.4	0.0
7		Male	4.9	1.0	0.0
2	Not employed full time	Female	0.2	0.3	0.0
8		Male	0.6	0.4	0.0
A child of respondent (above preschool age) at home – no preschool child of respondent at home:					
3	Employed full time	Female	2.7	1.9	0.1
9		Male	5.3	0.7	0.1
4	Not employed full time	Female	0.4	0.4	0.0
10		Male	0.2	0.0	0.0
No child of respondent at home:					
5	Employed full time	Female	3.6	2.0	0.0
11		Male	4.9	1.4	0.0
6	Not employed full time	Female	0.6	0.3	0.1
12		Male	0.6	0.4	0.0
Living with others (no spouse/partner at home)					
A preschool child of respondent at home:					
13	Employed full time	Female	3.3	0.8	0.0
14	Not employed full time	Female	0.4	0.0	0.0
Age 45-64					
Living with a spouse/partner					
No child of respondent at home:					
31	Employed full time	Female	3.1	2.3	0.0
35		Male	4.8	1.2	0.0
32	Not employed full time	Female	0.3	0.2	0.1
36		Male	0.1	0.0	0.2
A child (aged less than 19) of respondent at home					
		Female	1.4	1.5	0.1
		Male	3.5	1.1	0.0
Living alone					
No child of respondent at home:					
45	Employed full time	Female	2.4	2.4	0.0
47		Male	4.1	1.4	0.0
46	Not employed full time	Female	0.0	0.1	0.4
48		Male	0.0	0.0	0.2

See footnotes at the end of the table.

Table 2.3

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992**

(Hours per person per day, 7 days per week, comparable to 1986 table)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
D	E	F	G	H	I	
0.6	3.1	0.1	0.1	2.2	10.2	1
0.6	1.4	0.1	0.1	1.6	9.7	7
0.7	4.9	0.1	0.1	2.6	9.0	2
0.6	1.7	0.1	0.1	2.5	6.1	8
0.5	1.3	0.1	0.1	2.9	9.7	3
0.6	0.6	0.0	0.1	1.8	9.1	9
0.8	1.9	0.2	0.1	3.9	7.8	4
0.9	0.7	0.0	0.2	2.3	4.3	10
0.7	0.0	0.1	0.0	2.4	8.8	5
0.7	0.0	0.1	0.1	1.7	8.8	11
1.1	0.2	0.3	0.1	3.8	6.6	6
0.7	0.0	0.1	0.3	1.9	4.0	12
0.0	2.9	0.0	0.4	1.7	9.1	13
0.0	5.1	0.2	0.2	2.4	8.4	14
0.6	0.1	0.2	0.0	3.0	9.5	31
0.4	0.0	0.0	0.1	1.9	8.5	35
1.2	0.2	0.2	0.2	3.8	6.3	32
0.9	0.2	0.0	0.0	2.9	4.4	36
0.6	1.0	0.2	0.1	3.8	8.6	
0.6	0.3	0.0	0.1	2.5	8.1	
0.0	0.0	0.2	0.3	3.5	8.7	45
0.0	0.0	0.1	0.3	2.2	8.0	47
0.0	0.1	0.3	0.4	3.9	5.2	46
0.0	0.0	0.0	0.2	3.5	4.0	48

See footnotes at the end of the table.



Table 2.3

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, comparable to 1986 table)

Job-family obligations group <sup>2</sup>		Paid work Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>	Volunteer work for organizations
		A	B	C
<b>Age 20-64</b>				
<b>Living with others (no spouse/partner at home)</b>				
A child (aged less than 19) of respondent at home <sup>9</sup>	Female	1.7	0.8	0.0
	Male	2.5	1.0	0.3
A parent of respondent at home	Female	2.9	0.8	0.0
	Male	3.5	0.5	0.1
<b>Age 65 and over</b>				
Living with a spouse/partner – no child of respondent at home	Female	0.1	0.0	0.1
	Male	0.5	0.1	0.1
Living with others (no spouse/partner or child of respondent at home)	Female	0.0	0.0	0.1
Living alone – no child of respondent at home	Female	0.1	0.0	0.2
	Male	0.4	0.0	0.0

Table 2.3

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, comparable to 1986 table)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day
D	E	F	G	H	I
0.0	2.4	0.1	0.3	3.0	8.3
0.0	1.8	0.3	0.0	2.3	8.1
0.0	0.1	0.4	0.4	2.3	6.9
0.0	0.0	0.1	0.3	1.4	5.8
1.5	0.1	0.2	0.0	3.5	5.6
0.9	0.0	0.1	0.2	2.4	4.4
0.0	0.6	0.3	0.0	3.8	4.8
0.0	0.0	0.2	0.2	3.8	4.6
0.0	0.0	0.1	0.2	3.4	4.1

1 Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1 for the detailed category level and its relative frequency in the population. The hours shown in a line pertain to work-related episodes allocated to one specific group as the 'source'.

2 Production of these data requires merging records among the three 1992 GSS public-use files. Hours are calculated by taking each work-related time-use episode and weighting it both by the duration of the episode and the respondent's time-weight. Within the Episode File, multiple occurrences of the same type of episode are added and the respondent time-weight is used only once for the aggregate of those occurrences. All numbers in this table are time-weight as explained above, and will not equal totals computed from the Summary File, which uses a different respondent weight.

3 All industries excluding government and the community services.

4 Government and the community services industry groups.

5 Work outputs reasonably allocated at least in part to the spouse, based on the content of the activity and contact with the spouse during the activity. However, many of these outputs would have been used by other household members as well.

6 Activities included here go well beyond what the respondent specifically reported as being child care. Other work activities are allocated here based on the content of the activity and contact with the child during the activity. However, some of these outputs would have been used by other household members as well.

7 This destination includes some persons that are NOT in the respondent's household. Also, where household members are involved, some outputs destined in part to them are covered in portions of the figures shown in columns D, E, G and H. The data source does not allow these portions to be disentangled without a set of assumptions considerably more elaborate than that being used here.

8 Work outputs reasonably allocated at least in part to the respondent (the respondent both does the work and consumes the output), based on the content of the activity and reported contact with no one during the activity. However, many of these outputs would have been used by other household members as well.

9 The lines for age group 20-64 sometimes include data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).



Table 2.4

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1986**

(Hours per person per day, 7 days per week, work of economic value only)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work	Gov't. and	Volunteer
			Business <sup>3</sup>	comm. <sup>4</sup>	work for
			A	B	C
Age 20-44					
Living with a spouse/partner and					
A preschool child of respondent at home:					
1	Employed full time	Female	3.0	1.2	0.2
7		Male	5.0	1.3	0.0
2	Not employed full time	Female	0.4	0.4	0.1
8		Male	1.6	0.5	0.0
A child of respondent (above preschool age) at home – no preschool child of respondent at home:					
3	Employed full time	Female	3.7	1.6	0.0
9		Male	4.9	1.3	0.1
4	Not employed full time	Female	0.7	0.4	0.1
10		Male	2.2	0.5	0.0
No child of respondent at home:					
5	Employed full time	Female	3.6	1.6	0.0
11		Male	4.8	1.3	0.1
6	Not employed full time	Female	0.8	0.4	0.1
12		Male	1.6	0.4	0.1
Living with others (no spouse/partner at home)					
A preschool child of respondent at home:					
13	Employed full time	Female	3.7	0.8	0.0
14	Not employed full time	Female	0.2	0.2	0.1
Age 45-64					
Living with a spouse/partner					
No child of respondent at home:					
31	Employed full time	Female	3.3	1.3	0.2
35		Male	4.8	1.0	0.0
32	Not employed full time	Female	0.3	0.2	0.2
36		Male	0.2	0.3	0.3
A child (aged less than 19) of respondent at home					
		Female	1.3	0.8	0.2
		Male	3.6	1.2	0.1
Living alone					
No child of respondent at home:					
45	Employed full time	Female	2.9	1.8	0.0
47		Male	3.8	1.5	0.1
46	Not employed full time	Female	0.5	0.3	0.1
48		Male	0.6	0.0	0.1

See footnotes at the end of the table.

Table 2.4  
**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1986**  
 (Hours per person per day, 7 days per week, work of economic value only)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
D	E	F	G	H	I	
0.8	2.2	0.1	0.2	2.1	9.7	1
0.6	1.0	0.1	0.1	1.3	9.3	7
0.8	4.1	0.2	0.1	2.5	8.6	2
0.5	1.8	0.0	0.0	1.7	6.2	8
0.7	1.0	0.1	0.1	2.7	9.8	3
0.5	0.4	0.0	0.0	1.5	8.6	9
0.9	1.6	0.2	0.2	3.8	7.9	4
0.7	0.7	0.1	0.1	1.9	6.1	10
0.9	0.3	0.0	0.2	2.3	9.0	5
0.6	0.0	0.0	0.1	1.3	8.2	11
0.7	0.5	0.1	0.3	3.0	5.8	6
0.5	0.1	0.1	0.1	2.5	5.2	12
0.0	2.2	0.1	0.4	2.2	9.5	13
0.0	3.0	0.5	0.1	2.1	6.2	14
0.9	0.2	0.2	0.1	2.7	8.9	31
0.5	0.0	0.0	0.1	1.6	8.0	35
1.3	0.3	0.2	0.2	3.8	6.4	32
0.8	0.1	0.1	0.1	2.2	4.0	36
1.1	0.8	0.2	0.3	3.6	8.3	
0.7	0.5	0.1	0.1	1.6	7.9	
0.0	0.3	0.0	0.3	3.2	8.5	45
0.0	0.0	0.0	0.4	2.5	8.3	47
0.0	0.3	0.6	0.4	4.0	6.3	46
0.0	0.0	0.0	0.4	2.5	3.6	48

See footnotes at the end of the table.



Table 2.4

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1986 – Concluded**

(Hours per person per day, 7 days per week, work of economic value only)

Job-family obligations group <sup>2</sup>		Paid work		Volunteer work for organizations
		Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>	
		A	B	C
<b>Age 20-64</b>				
<b>Living with others (no spouse/partner at home)</b>				
A child (aged less than 19) of respondent at home <sup>9</sup>	Female	1.5	0.8	0.1
	Male	4.1	0.4	0.0
A parent of respondent at home	Female	2.8	0.7	0.2
	Male	3.2	0.3	0.0
<b>Age 65 and over</b>				
Living with a spouse/partner – no child of respondent at home	Female	0.1	0.1	0.2
	Male	0.3	0.1	0.2
Living with others (no spouse/partner or child of respondent at home)	Female	0.3	0.2	0.1
Living alone – no child of respondent at home	Female	0.0	0.0	0.1
	Male	0.2	0.2	0.0

Table 2.4  
**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, Canada, 1986 – Concluded**  
 (Hours per person per day, 7 days per week, work of economic value only)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day
D	E	F	G	H	I
0.0	1.7	0.2	0.2	2.7	7.3
0.2	0.5	0.1	0.1	1.7	7.1
0.0	0.1	0.4	0.3	1.9	6.5
0.0	0.0	0.2	0.2	1.2	5.2
1.8	0.2	0.2	0.2	3.1	5.8
1.0	0.0	0.1	0.1	1.9	3.7
0.1	0.2	0.6	0.2	2.7	4.2
0.0	0.1	0.2	0.3	3.5	4.4
0.0	0.0	0.1	0.2	2.6	3.4

<sup>1</sup> Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1 for the detailed category level and its relative frequency in the population. The hours shown in a line pertain to work-related episodes allocated to one specific group as the 'source'.

<sup>2</sup> Production of these data requires merging records among the three 1992 GSS public-use files. Hours are calculated by taking each work-related time-use episode and weighting it both by the duration of the episode and the respondent's time-weight. Within the Episode File, multiple occurrences of the same type of episode are added and the respondent time-weight is used only once for the aggregate of those occurrences. All numbers in this table are time-weight as explained above, and will not equal totals computed from the Summary File, which uses a different respondent weight.

<sup>3</sup> All industries excluding government and the community services.

<sup>4</sup> Government and the community services industry groups.

<sup>5</sup> Work outputs reasonably allocated at least in part to the spouse, based on the content of the activity and contact with the spouse during the activity. However, many of these outputs would have been used by other household members as well.

<sup>6</sup> Activities included here go well beyond what the respondent specifically reported as being child care. Other work activities are allocated here based on the content of the activity and contact with the child during the activity. However, some of these outputs would have been used by other household members as well.

<sup>7</sup> This destination includes some persons that are NOT in the respondent's household. Also, where household members are involved, some outputs destined in part to them are covered in portions of the figures shown in columns D, E, G and H. The data source does not allow these portions to be disentangled without a set of assumptions considerably more elaborate than that being used here.

<sup>8</sup> Work outputs reasonably allocated at least in part to the respondent (the respondent both does the work and consumes the output), based on the content of the activity and reported contact with no one during the activity. However, many of these outputs would have been used by other household members as well.

<sup>9</sup> The lines for age group 20-64 sometimes include data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).



By comparing Groups 1, 3 and 5 regarding the sums of columns A to C, one can see a statistical association of family obligation with proportion of work output destined to business or other sources of paid employment for young married women that had a full-time job. The average is 4.3 hours per person per day for those who had a preschool child at home, 4.6 hours for those who had a child at home but none of preschool age, versus 5.6 hours for those who had no child under 19 years of age at home. (To illustrate how these figures are obtained, add 2.8, 1.4 and 0.1 from the first line of Table 2.2, and the result is 4.3.)

These illustrative comparisons suggest how the core table can be used in the context of simulation models designed to answer certain 'what if' questions. For example, the simple (or marginal) distribution of work over all the destinations is a function of the marginal distribution of population over the Job-Family Obligations Groups and of the configuration of numbers in the core table. For some 'what if' simulations, we might use the core table to compute the potential effects of arriving at a different distribution of population over the categories of the Job-Family Obligations variable. The policy interest might be focussed not so much on what happens to the whole distribution of work outputs over destinations; but on what happens to the volume flowing to a particular destination. For example, what would happen to the volume of time spent in child-oriented work, per child, if the proportion of young married women with full-time jobs was to rise (or fall) by a substantial margin? The following paragraphs use the figures in the illustrative lines 1 and 2 above (Text Table A) to provide a simple illustration.

In 1992 an estimated 427,000 women were in the group represented by line 1, while there were about 1,049,000 men represented by line 2 (see Table 2.1, column G, Groups 1 and 7). Using these figures, the total daily number of hours of unpaid work output used by children and provided by the two population groups named in lines 1 and 2 of Text Table A was 2,792,000.

A similar total can be computed by taking into account all the Job-Family Obligations Groups that had at least one preschool child at home. Shifts in the distribution of the population among these Job-Family Obligations Groups can change that total, other things being equal. To imagine how such

changes could arise and heighten related public policy concerns, consider the women who were similar to those represented by line 1, *except* they did *not* have a full-time job. For these women, the average hours of work output used by children, per person per day in 1992, was 4.9 (see Table 2.2, Group 2, column F). (The corresponding figure in line 1 of Text Table A above is 3.1.)

In 1992 there were 785,000 such women (see Table 2.1, Group 2). If this number was cut by one half and the reduction was added to the number of women represented by line 1 above, the weight of the average of 3.1 (see line 1 in Text Table A above) in the grand total number of hours of child-oriented work would be sharply increased. In contrast, the weight for 4.9 would be reduced. *Other things being equal*, such a sharp rise in the proportion of women with preschool children and holding down full-time jobs would result in a significant fall in the total number of unpaid child-oriented work hours.

The foregoing discussion is intended to give an over-simplified illustration of how the design of the core table can be helpful in producing data that are relevant to important questions in the field of public policies. This illustration of the conduct of a 'what-if' simulation should serve to emphasize the idea that the usefulness of the core table depends on having estimates for two related simple distributions – (1) that dealing with the distribution of population over the Job-Family Obligations Groups, and (2) that dealing with the distribution of work outputs over the classes of recipients of that output.

The 'what if' simulation can also take into account changes in the patterning of the numbers *within* the core table. Pursuing the example just cited, it may be argued that should the proportion of young married women with full-time jobs rise (or fall) by a substantial margin the pattern of their work outputs over alternative destinations would have to be changed. If the changes can be set-up as hypothetical shifts in values of certain numbers *within* the core table, then the simulation can be run with both changed population distribution and changed patterns of work output for certain Job-Family Obligations Groups.

To illustrate this idea, take note of the estimate that married women aged 20-44 with a full-time

job and a preschool child spent an average of 3.1 hours per day in child-oriented work. Suppose this average is affected by a substantial number of other persons who provide child-care services to those women. Assume that during a major increase of the proportion of married women holding down full-time jobs there is a simultaneous reduction in the availability of other persons to provide child-care services. In that situation, the average of 3.1 just cited, may have to be raised to a number that is closer to the 4.9 shown in Table 2.2 for the counterparts of those married women who did not have a full-time job. The number might be 3.6, for example. (This could be produced by a reduction in the married women's leisure time.) The 'what if' simulation would then use the average of 3.6, instead of the 3.1 shown in line 1 above (and in the same line of Table 2.2).

An important factor in the usefulness of such simulations is the ability to estimate variants of the core table for specific population strata. Thanks to the firm linkage of the TWAS to its micro-data foundations that is easily done. Tables 2.5 and 2.6 show variants of the core table for persons with university education and for those whose spouses had full-time jobs.

Another key set of variants of the core table involves breaking down the paid-work destinations into the industry groups where most of the work was done. The Job-Family Obligations Groups already provide some breakdown of the population by employment status. A further breakdown into educational groups provides a foundation for the delivery of data that are relevant to policies regarding access to work-related training and educational opportunities. These ideas will be further developed in the next chapter, which deals with auxiliary tables of the TWAS.

The general structure formed by the core table and the two closely related simple distributions discussed above is represented schematically in Figure 2.2. In this diagram, COREMAT(.....) refers to the core table. Surrounding COREMAT(.....) are the two important simple distributions. On the left is the distribution of population over all the Job-Family Obligations categories. Below the core table is the simple distribution of all work outputs over all destinations. The sum of all the hours in the latter distribution divided by the sum of the population

in all the Job-Family Obligations categories is a global measure of per capita hours of work output per day. The pertinent computational procedures are suggested in the symbols and formulas set out below Figure 2.2.

## 2.4 Extension to Include Personal Investment Work Such as Education and Training

As noted earlier, coverage of total productive work is achieved by adding columns to the WEV table. An important purpose of adding these new columns would be to display investment use of time in connection with education and training activities. This idea is applied in Chapter 5 below.

When focussing on investment use of time, we can aggregate certain columns of the WEV table that are not especially pertinent to the substantive questions being explored. This extended table will readily display the association of particular work-output patterns with varying amounts of time spent in education and training.

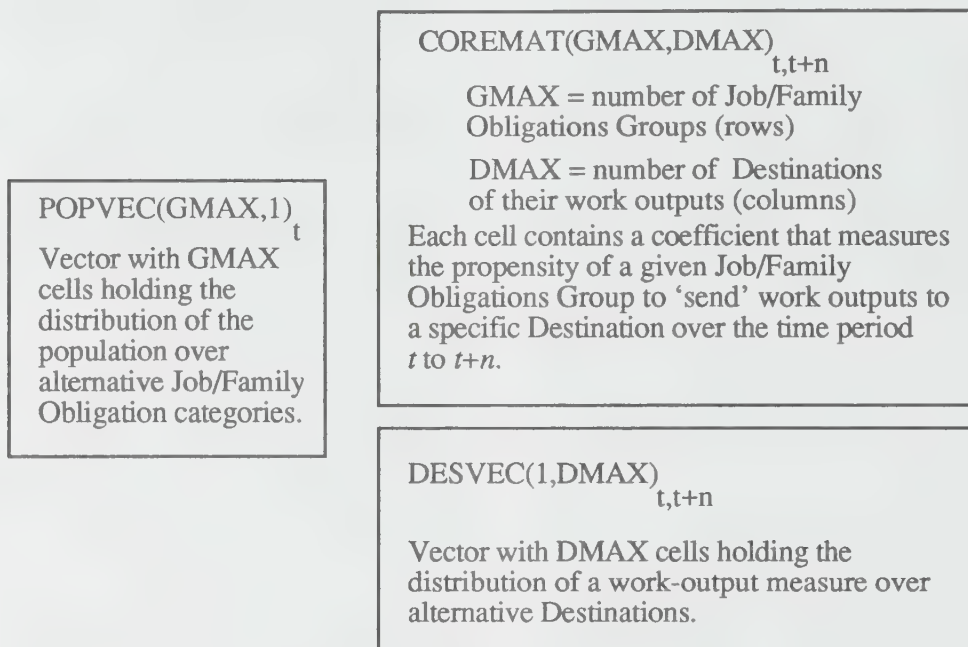
Education, here, is taken in a broad sense including that which is dispensed in learning institutions, as well as in businesses or in other milieu (in volunteer work settings or in the family, for example).

However it is necessary to note that a portion of training provided by businesses during the employee's work-days may be hidden within the totals for paid work because of the nature of the GSS questions relating to time use. (For related discussion see Juster 1985.) Several authors have proposed that extensions of the concept of production or capital include the commitment of time to education (Nordhaus and Tobin 1972; Economic Council of Japan 1973; Sharma and Ram 1974; Kendrick 1976; Eisner 1978; Chicha-Pontbriand 1983).

Many factors, both in the family sphere and in the labour market, affect the demand for education (see Chicha-Pontbriand 1983). TWAS is designed to support analysis of the relations between these factors and educational activities. For example, many mothers in the labour market may find it very difficult to reconcile their Job-Family Obligations with devotion of time to education.

Figure 2.2

**Schematic Diagram of the TWAS Core Matrix and the Principal Vectors that Represent Measures of Input Sources and Outputs**



$$POP_t = \sum_g^{GMAX} POPVEC(g,1)_t$$

$$\overline{POP} = \left[ POP_t + POP_{t+n} \right] \star 0.5$$

$$WORK\_OUTPUT_{t,t+n} = \sum_d^{DMAX} DES(d)_{t,t+n}$$

DES(d) is an element in the vector DESVEC(1,DMAX).

$$WORK\_OUTPUT_{PER\ CAPITA} = WORK\_OUTPUT / \overline{POP}$$

U(d) = Measure of the number of units at Destination  $d$

$$DES(d)_{t,t+n} / \int [U(d)_t, U(d)_{t+n}] =$$

Measure of total work output received per recipient at Destination  $d$ , e.g., measure of the volume of child-oriented work outputs per child.



Often the hours in which training is offered by businesses prevent the participation of employees who have family responsibilities. TWAS will help analysts concerned with this class of issues by providing data that simultaneously display time commitments to education and those to other forms of work.

The pattern of participation of the unemployed in educational activities is also important. When unemployment is high, supplementary diplomas may improve odds of finding paid work. Participation of the unemployed in educational activities should be analyzed by using data which display other aspects of their work outputs. This is especially important for those that have major family-related work obligations. These are the kinds of data provided by the TWAS. The discussion in Chapter 5 will illustrate how TWAS concepts and data can be used to provide information that supports current public debates and policy deliberations relating to aspects of work that involve education and training.

Table 2.5

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons with Some University Education, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work		Unpaid work for business	Volunteer work for organizations
			Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>		
			A	B	C	D
<b>Age 20-44</b>						
<b>Living with a spouse/partner and</b>						
A preschool child of respondent at home:						
1	Employed full time	Female	2.1	2.1	0.0	0.0
7		Male	4.4	1.5	0.0	0.0
2	Not employed full time	Female	0.1	0.5	0.0	0.1
8		Male	0.4	0.4	0.4	0.0
A child of respondent (above preschool age) at home – no preschool child of respondent at home:						
3	Employed full time	Female	2.3	2.6	0.0	0.2
9		Male	5.2	0.9	0.0	0.0
4	Not employed full time	Female	0.2	1.0	0.0	0.1
10		Male	0.0	0.0	0.0	0.0
No child of respondent at home:						
5	Employed full time	Female	2.8	2.7	0.0	0.1
11		Male	4.4	1.6	0.1	0.0
6	Not employed full time	Female	0.3	0.5	0.2	0.2
12		Male	0.9	0.6	0.0	0.0
<b>Living with others (no spouse/partner at home)</b>						
A preschool child of respondent at home:						
13	Employed full time	Female	3.0	1.0	0.0	1.0
14	Not employed full time	Female	0.7	0.0	0.0	0.0
<b>Age 45-64</b>						
<b>Living with a spouse/partner</b>						
No child of respondent at home:						
31	Employed full time	Female	2.2	2.7	0.3	0.1
35		Male	4.2	2.0	0.1	0.1
32	Not employed full time	Female	0.6	0.1	0.1	0.3
36		Male	0.3	0.0	0.0	0.4
A child (aged less than 19) of respondent at home						
		Female	0.7	2.3	0.0	0.2
		Male	3.0	1.3	0.0	0.0
<b>Living alone</b>						
No child of respondent at home:						
45	Employed full time	Female	1.6	3.2	0.0	0.0
47		Male	3.8	2.2	0.0	0.0
46	Not employed full time	Female	0.0	0.0	0.0	1.0
48		Male	0.0	0.0	0.0	0.0

See footnotes at the end of the table.

Table 2.5

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons with Some University Education, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
E	F	G	H	I	J	
0.5	2.9	0.0	0.1	2.5	10.2	1
0.7	1.6	0.0	0.1	1.8	10.1	7
0.5	5.1	0.1	0.3	3.2	9.9	2
1.1	1.8	0.0	0.0	2.5	6.5	8
0.5	1.6	0.1	0.2	3.0	10.5	3
0.4	0.6	0.0	0.2	1.8	9.1	9
0.9	1.9	0.1	0.2	4.0	8.3	4
0.8	1.5	0.0	0.0	3.8	6.0	10
0.7	0.0	0.1	0.1	2.4	8.9	5
0.7	0.1	0.1	0.1	1.7	8.6	11
0.9	0.2	0.3	0.3	3.9	6.7	6
0.6	0.0	0.3	0.3	1.5	4.3	12
0.0	3.0	0.0	0.0	2.0	10.0	13
0.0	5.5	0.0	0.0	2.1	8.2	14
0.5	0.1	0.2	0.1	3.2	9.5	31
0.4	0.1	0.0	0.1	2.2	9.1	35
1.2	0.2	0.2	0.2	4.1	6.9	32
1.3	0.3	0.0	0.1	4.0	6.4	36
0.7	1.3	0.1	0.1	3.8	9.1	
0.8	0.3	0.0	0.1	2.3	7.8	
0.0	0.0	0.0	0.3	3.7	8.8	45
0.0	0.0	0.0	0.2	1.8	8.1	47
0.0	0.0	0.0	0.3	4.0	5.3	46
0.0	0.0	0.0	0.0	4.1	4.1	48

See footnotes at the end of the table.



Table 2.5

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons with Some University Education, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Job-family obligations group <sup>2</sup>		Paid work		Unpaid work for business	Volunteer work for organizations
		Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>		
		A	B	C	D
<b>Age 20-64</b>					
<b>Living with others (no spouse/partner at home)</b>					
A child (aged less than 19) of respondent at home <sup>5</sup>	Female	1.9	1.0	0.0	0.1
	Male	2.0	2.0	0.0	0.0
A parent of respondent at home	Female	3.2	0.9	0.1	0.0
	Male	2.9	0.9	0.0	0.1
<b>Age 65 and over</b>					
Living with a spouse/partner – no child of respondent at home	Female	0.1	0.0	0.0	0.2
	Male	0.4	0.2	0.3	0.2
Living with others (no spouse/partner or child of respondent at home)	Female	0.0	0.0	0.0	0.5
Living alone – no child of respondent at home	Female	0.0	0.1	0.0	0.1
	Male	1.3	0.0	0.0	0.0

Table 2.5

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons with Some University Education, Canada, 1992 – Concluded**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day
E	F	G	H	I	J
0.0	2.2	0.1	0.2	3.2	8.7
0.0	1.0	0.5	0.0	2.0	7.7
0.0	0.1	0.4	0.2	2.4	7.3
0.0	0.0	0.1	0.4	1.3	5.6
1.6	0.2	0.1	0.0	3.6	5.8
1.1	0.1	0.0	0.2	2.4	4.8
0.0	0.0	0.0	0.0	3.3	3.8
0.0	0.0	0.3	0.3	4.5	5.4
0.0	0.0	0.0	0.3	3.8	5.4

<sup>1</sup> Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1 for the detailed category level and its relative frequency in the population. The hours shown in a line pertain to work-related episodes allocated to one specific group as the 'source'.

<sup>2</sup> Production of these data requires merging records among the three 1992 GSS public-use files. Hours are calculated by taking each work-related time-use episode and weighting it both by the duration of the episode and the respondent's time-weight. Within the Episode File, multiple occurrences of the same type of episode are added and the respondent time-weight is used only once for the aggregate of those occurrences. All numbers in this table are time-weight as explained above, and will not equal totals computed from the Summary File, which uses a different respondent weight.

<sup>3</sup> All industries excluding government and the community services.

<sup>4</sup> Government and the community services industry groups.

<sup>5</sup> Work outputs reasonably allocated at least in part to the spouse, based on the content of the activity and contact with the spouse during the activity. However, many of these outputs would have been used by other household members as well.

<sup>6</sup> Activities included here go well beyond what the respondent specifically reported as being child care. Other work activities are allocated here based on the content of the activity and contact with the child during the activity. However, some of these outputs would have been used by other household members as well.

<sup>7</sup> This destination includes some persons that are NOT in the respondent's household. Also, where household members are involved, some outputs destined in part to them are covered in portions of the figures shown in columns E, F, H and I. The data source does not allow these portions to be disentangled without a set of assumptions considerably more elaborate than that being used here.

<sup>8</sup> Work outputs reasonably allocated at least in part to the respondent (the respondent both does the work and consumes the output), based on the content of the activity and reported contact with no one during the activity. However, many of these outputs would have been used by other household members as well.

<sup>9</sup> The lines for age group 20-64 sometimes include data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).

Table 2.6

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons Whose Spouses Did Paid Work for 30 or More Hours Per Week, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work		Unpaid work for business	Volunteer work for organizations
			Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>		
			A	B	C	D
<b>Age 20-44</b>						
<b>Living with a spouse/partner and</b>						
<b>A preschool child of respondent at home:</b>						
1	Employed full time	Female	2.9	1.5	0.0	0.0
7		Male	4.8	1.1	0.0	0.1
2	Not employed full time	Female	0.1	0.4	0.1	0.1
8		Male	0.5	0.9	0.0	0.0
<b>Child of respondent (above preschool age) at home – no preschool child of respondent at home:</b>						
3	Employed full time	Female	2.8	1.8	0.0	0.1
9		Male	5.3	0.7	0.0	0.1
4	Not employed full time	Female	0.4	0.5	0.0	0.0
10		Male	0.0	0.0	0.0	0.0
<b>No child of respondent at home:</b>						
5	Employed full time	Female	3.6	2.2	0.0	0.0
11		Male	5.0	1.4	0.0	0.0
6	Not employed full time	Female	0.6	0.3	0.1	0.1
12		Male	0.9	0.7	0.0	0.0
<b>Age 45-64</b>						
<b>Living with a spouse/partner</b>						
<b>A child (aged less than 19) of respondent at home:</b>						
29	Employed full time	Female	2.0	2.7	0.0	0.2
30	Not employed full time	Female	0.5	0.5	0.0	0.2
<b>No child of respondent at home:</b>						
31	Employed full time	Female	3.4	2.4	0.3	0.0
35		Male	4.6	1.5	0.1	0.1
32	Not employed full time	Female	0.4	0.3	0.1	0.2
36		Male	0.5	0.0	0.0	0.0
<b>A child (aged less than 19) of respondent at home</b>						
		Female	1.4	1.8	0.0	0.2
		Male	3.4	0.5	0.2	0.2

See footnotes at the end of the table.



Table 2.6

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons Whose Spouses Did Paid Work for 30 or More Hours Per Week, Canada, 1992**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
E	F	G	H	I	J	
0.6	3.0	0.1	0.1	2.3	10.4	1
0.6	1.6	0.1	0.1	1.7	10.0	7
0.6	5.2	0.1	0.1	2.9	9.6	2
1.4	2.4	0.5	0.0	1.9	7.5	8
0.5	1.4	0.1	0.1	3.1	10.0	3
0.6	0.6	0.0	0.2	1.9	9.5	9
0.7	2.0	0.2	0.1	4.2	8.2	4
0.5	1.1	0.0	0.0	2.7	4.3	10
0.7	0.0	0.1	0.0	2.4	9.2	5
0.7	0.0	0.0	0.0	1.9	9.2	11
1.2	0.1	0.4	0.2	4.2	7.3	6
0.9	0.0	0.2	0.2	2.1	5.2	12
0.6	0.5	0.0	0.1	3.4	9.4	29
0.4	1.8	0.2	0.2	4.7	8.5	30
0.5	0.1	0.1	0.1	3.4	10.2	31
0.5	0.1	0.0	0.1	2.2	9.1	35
0.8	0.4	0.2	0.2	4.4	7.0	32
0.7	0.2	0.0	0.2	5.1	6.8	36
0.5	1.0	0.1	0.1	3.9	9.1	
0.5	0.3	0.0	0.3	2.6	8.0	

See footnotes at the end of the table.

Table 2.6

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations,  
by Destination of the Work Output, for Persons Whose Spouses Did Paid Work for 30 or  
More Hours Per Week, Canada, 1992 — Concluded**

(Hours per person per day, 7 days per week, work of economic value only — e.g., excludes commuting to place of paid work)

Group No. <sup>1</sup>	Job-family obligations group <sup>2</sup>		Paid work		Unpaid	Volunteer
			Business <sup>3</sup>	Gov't. and comm. <sup>4</sup>	work for business	work for organizations
			A	B	C	D
<b>Age 65 and over</b>						
<b>Living with a spouse/partner</b>						
No child of respondent at home:						
56	Not employed full time	Female	0.0	0.0	0.0	0.0
60		Male	0.0	0.0	0.0	0.0
	No child of respondent at home	Female	2.3	0.0	0.0	0.0
		Male	0.0	0.0	0.0	0.0

Table 2.6

**Hours of Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, by Destination of the Work Output, for Persons Whose Spouses Did Paid Work for 30 or More Hours Per Week, Canada, 1992 — Concluded**

(Hours per person per day, 7 days per week, work of economic value only – e.g., excludes commuting to place of paid work)

Spouse/partner <sup>5</sup>	Child primarily <sup>6</sup>	Adult family member <sup>7</sup>	Friends and others	Self and others in household <sup>8</sup>	Total hours per person per day	Group No. <sup>1</sup>
E	F	G	H	I	J	
1.0	1.0	0.0	0.0	3.1	5.2	56
1.3	0.0	0.0	0.0	1.3	2.7	60
0.8	0.8	0.0	0.0	3.8	7.5	
1.3	0.0	0.0	0.0	1.3	2.5	

<sup>1</sup> Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1 for the detailed category level and its relative frequency in the population. The hours shown in a line pertain to work-related episodes allocated to one specific group as the 'source'.

<sup>2</sup> Production of these data requires merging records among the three 1992 GSS public-use files. Hours are calculated by taking each work-related time-use episode and weighting it both by the duration of the episode and the respondent's time-weight. Within the Episode File, multiple occurrences of the same type of episode are added and the respondent time-weight is used only once for the aggregate of those occurrences. All numbers in this table are time-weight as explained above, and will not equal totals computed from the Summary File, which uses a different respondent weight.

<sup>3</sup> All industries excluding government and the community services.

<sup>4</sup> Government and the community services industry groups.

<sup>5</sup> Work outputs reasonably allocated at least in part to the spouse, based on the content of the activity and contact with the spouse during the activity. However, many of these outputs would have been used by other household members as well.

<sup>6</sup> Activities included here go well beyond what the respondent specifically reported as being child care. Other work activities are allocated here based on the content of the activity and contact with the child during the activity. However, some of these outputs would have been used by other household members as well.

<sup>7</sup> This destination includes some persons that are NOT in the respondent's household. Also, where household members are involved, some outputs destined in part to them are covered in portions of the figures shown in columns E, F, H and I. The data source does not allow these portions to be disentangled without a set of assumptions considerably more elaborate than that being used here.

<sup>8</sup> Work outputs reasonably allocated at least in part to the respondent (the respondent both does the work and consumes the output), based on the content of the activity and reported contact with no one during the activity. However, many of these outputs would have been used by other household members as well.

**Source:** 1992 General Social Survey microdata files (Statistics Canada).





## Chapter 3

# Auxiliary Tables

The utility of the data in the core table depends upon the ability of an analyst to link these data to other tables that display how the population is distributed among categories of variables that help to determine an individual's work pattern. These variables include education and training, health and fitness, and family and household relationships. The aspects of these variables that are pertinent include the following:

- activity patterns that are involved in education and training (both formal and informal);
- activity patterns that promote or manifest the achievement of particular states of health and fitness;
- networks of obligation that arise from the development of certain relationships involving familial ties and living arrangements;
- patterns of participation in reception of certain major flows of formal and informal supports that are relevant to work output.

To reflect these considerations within the context of the TWAS, we will construct sets of auxiliary tables. These tables display joint distributions of population over combinations of demographic attributes and of categories of other selected variables. These combinations deal with aspects of the just-cited activity patterns, networks of work and family obligation and flows of support.

It should be noted that major aspects of familial relationships and living arrangements are already built into the definitions of rows in the core table. The attention paid to these relationships in the paragraph above is merely to signal that more detailed treatment of them (than that provided in the core table), will be pursued through the development of auxiliary tables.

Three types of auxiliary tables surround the core table in the TWAS. The following commentary provides information about the possible contents and the structures of these tables. The four kinds of auxiliary tables can be characterized briefly in terms of their uses:

- *Type 1*: tables to be used in explanatory analysis of, and simulation of changes in, the distribution of population over alternative Job-Family Obligations Groups
- *Type 2*: tables to be used in displaying socio-economic, e.g., educational and occupational differences, in pattern of work outputs within a single Job-Family Obligations Group
- *Type 3*: tables for use in portraying patterns of allocation of work outputs within sub-categories of a specific destination, e.g., allocation of paid-work outputs among industry groups or the pattern of allocation of child-care related services over children of different ages in households

## 3.1 Type 1 – Tables for Use in Analyzing the Distribution of Population Over Alternative Job-Family Obligations Groups

Auxiliary tables of type 1 are designed to support analyses of the distribution of population over the set of Job-Family Obligations groups. These analyses would deal with reasons why that population distribution has a particular shape at a given time point, or why that shape may be changing in a certain way, or how it might change as a result of certain policies and programs. These are important concerns because the pattern of the distribution and its changes influence the volume of work outputs going to each of the major destinations.

Results of the analyses just cited are applied in the TWAS by expressing the volume of work output received at a given destination (e.g., children) as a function of the joint use of the core table and the distribution of the population over alternative Job-Family Obligations Groups. A by-product of the design of the auxiliary tables of Type 1 is the allowance for simulation modelling of the impacts of alternative patterns of population mobility (e.g., mobility among educational levels) on the per capita volumes of work destined to specific classes of recipients of the work outputs. To make this discussion concrete, we will use the examples of child-care related services and of paid work outputs.

Let us consider first the case of child care and related services. The volume of child-care-related services delivered depends partly on the distribution of the population over attributes that are related to the propensity or the capability to deliver child-care-related services. Consider the following illustrative data.

Text Table B  
Illustrative Figures for a Portion of the Frequency  
Distribution of Population Over Alternative  
Job-Family Obligations Groups

Job-family obligations groups		Numerical weight	
		Original number	Changed number
		A	B
Females aged 20–44, living with a spouse/partner and a preschool aged child:			
Employed full time	(3)	427,000	819,500
Not employed full time	(4)	785,000	392,500

The differences between the original and changed numbers shown above came about in the process of making a 'what-if' simulation. Differences of that kind, though perhaps of a lesser degree, could arise in the real world over a period of time as a result of 'natural' socio-economic and demographic forces. Some of these forces are responsive to policy changes.

An important set of auxiliary tables of TWAS is designed to facilitate linkage of information about such actual or potential differences to shifts in the volume of work outputs received at specific destinations. Recall the following conclusion from the simplified 'what-if' simulation in Chapter 2: "*other things being equal*, such a sharp rise in the proportion of women holding down full-time jobs with preschool children, and the corresponding reduction in the proportion for their counterparts who did not hold a full-time job, would result in a significant fall in the average number of unpaid child-oriented work hours per recipient (i.e. per child)." Auxiliary tables of Type 1 are designed to allow analysts to portray and analyze a rise in the proportion of women with preschool children and

holding down full-time jobs, and a corresponding reduction in the proportion for their counterparts who did not hold a full-time job.

The auxiliary tables will need to be able to reflect the results of a variety of sources of change in population composition. For example, if the focus is on shifts in the age-sex structure of population then the auxiliary tables would need to cover rates of fertility, mortality and migration for specific age-sex categories. This application cannot be illustrated simply. A different kind of application may be helpful for achieving simple illustration.

Take note that an economic classification is involved in defining the Job-Family Obligations Groups – having a full-time job versus not having a full-time job.<sup>4</sup> How any particular demographic group is distributed between these two economic categories will depend upon its educational composition – i.e. how it is distributed among categories that indicate low, medium or high levels of education. A auxiliary table would show how the demographic group is distributed among categories of education. Text Table C is a representation of such a table.

Text Table C  
Schematic Diagram for a Table Displaying the  
Distribution of Job-Family Obligations Groups Among  
Educational Levels at a Given Point of Time

Job-family obligations groups	Educational attainment levels		
	High	Medium	Low
	A	B	C
Females aged 20-44, living with a spouse/partner and a preschool aged child:			
Employed full time	...	...	...
Not employed full time	...	...	...

Of particular interest are the effects of changing education composition. Between two points of time, the same demographic group might show quite different educational compositions. To

See end notes at the end of the publication.



analyze the shift in educational composition, another auxiliary table would have levels of educational attainment in both its rows and its columns. A cell of the table would contain a coefficient that is a function of the group-specific probability of 'moving' from one particular level of education to another over the time period in question.<sup>5</sup> By making use of the numbers in such a table, we can statistically generate a shift in the educational composition of the demographic group for the purposes of simulation modelling.

A table such as that represented by Text Table D would apply to a single Job-Family Obligations Group – e.g., women aged 20-44, living with a spouse and a preschool child, and having a full-time job. The educational mobility, between 'time 1' and 'time 2' of such a group will influence its distribution between having and not having a full-time job at 'time 2'.

Text Table D  
**Schematic Diagram for a Table Displaying the Patterns of Mobility Among Educational Levels Between Two Points of Time**

Educational levels at time 1		Educational levels at time 2		
		High	Medium	Low
		A	B	C
High	(A)	...	...	...
Medium	(B)	...	...	...
Low	(C)	...	...	...

Thus another auxiliary table of the following kind is needed. What follows is a schematic representation of a table whose contents would be numbers that reflect group-specific probabilities of being with or without a full-time job, depending on the level of educational attainment:

Coefficients in the three tables just represented schematically in Text Tables C, D and E could be helpful in simulating the potential effects of educational mobility upon the volume of work

Text Table E  
**Schematic Diagram for a Table Displaying Estimates of Being in Given Employment Statuses According to Educational Level for a Specific Sub-Population**

Educational levels at time 1		Employment level	
		Employed full time	Not employed full time
		1	2
High	(A)	...	...
Medium	(B)	...	...
Low	(C)	...	...

output received at a given destination (e.g., children, or business and other organizations). First, each Job-Family Obligations Group can would be redistributed among educational levels between two points of time (called "time 1" and "time 2" above, in Text Table D). The effect of that redistribution upon the numbers who would, or would not, have full-time jobs at 'time 2' is then computed (estimated probabilities of the kind cited in Text Table E would be used). The result would be a new distribution, at 'time 2', of the population over the alternative Job-Family Obligations Groups, as a result of the educational mobility. This new distribution is then applied to the coefficients in the core table of TWAS to compute the potential volume of work output going to each destination (a simplified version of the procedure was shown in the illustrative 'what-if' simulation presented above).

Thus, we could use the auxiliary tables to compute the extent to which an increased proportion of university-educated members of a demographic group might lead to a rise in the weight of full-time-job holders in the group. That rise would be directly reflected in the relative numbers of persons in the various Job-Family Obligations Groups. Given that rise, the work-output patterns for groups with full-time jobs would, other things being equal, become more common in the whole population. That would in turn affect the per capita volume of work directed to specific destinations such as children or voluntary organizations.

See end notes at the end of the publication.

The foregoing discussion is an oversimplified representation of the simulation processes. The simulation would need to take into account other variables, such as mortality, marital status change, etc. The actual simulation technique could be of the micro-simulation variety. It could also be macro-simulation, provided that information about population groups is kept in the form of records in a set of relational databases. The key point about the latter approach is that coefficients of the auxiliary tables are identified by a string of codes which represent population attributes. This procedure allows a single population group to be defined in terms of a large number of attributes similar to that which one will find in a micro-simulation model.<sup>6</sup>

In short, the Type 1 auxiliary tables are used to display detailed breakdowns of Job-Family Obligations Groups among categories of variables that are not used in defining those groups (e.g., educational attainment). They are also used to display patterns of 'mobility' for the Job-Family Obligations Groups among categories of such variables. These auxiliary tables would help analysts understand the processes that generate changes in the distribution of population over the

alternative Job-Family Obligations Groups. They might also be used in the analysis of shifts in the pattern of work outputs shown by one particular Job-Family Obligations Group.

The focus of the foregoing discussion upon educational attainment is for illustrative purposes only. A similar illustration can be constructed with a focus on other variables that are important in shaping the distribution of the population over alternative Job-Family Obligations Groups. Another focus might involve the composition of population with regard to defined states of physical and mental fitness, and with mobility among these states. This could be a important process in analyzing the volume of work destined to business and other organizations.

3.2 Type 2 – Tables for Use in Portraying the Statistical Impacts of Socio-Economic Factors on Work Output Pattern

The discussion in Section 3.1 implies that the pattern of the distribution of work outputs over alternative destinations depends partly on the educational and occupational composition of the population. For some purposes, it is important to be able to display data that are indicators of this

See end notes at the end of the publication.

Text Table F  
Illustration of the Pattern of Distribution of Hours of Work Per Person Per Day Over Alternative Destinations, for Different Educational Levels Within a Single Job-Family Obligations Group

Job-family obligations group	Destinations			
	Paid work – business or government	Unpaid work – business and voluntary organization	Children	Other family friends, household, self
	A	B	C	D
Educational levels of females aged 20-44, living with a spouse/partner, a preschool aged child and employed full time:				
University	...	...	...	...
Secondary	...	...	...	...
Elementary	...	...	...	...

dependency. Suppose, for example, there is an interest in educational differences in the pattern of work outputs. These differences can be indicated by breaking down a single Job-Family Obligations Group into educational classes, as illustrated above in Section 3.1. For each class, the distribution of work outputs over alternative destinations could then be displayed. The following is a schematic representation of such a display.

A more elaborate illustration of a Type 2 auxiliary table is given in Table 2.5, where we display a core table that is limited to persons that have university degrees. By comparing the figures in that table with those in the alternative table for persons without university degrees, we can begin an analysis of the association of educational attainment with the level of paid-work outputs within specific (i.e. holding constant) Job-Family Obligations groups.

The focus upon educational attainment in the foregoing discussion is for illustrative purposes only. A similar illustration could be built for other aspects of socio-economic status, e.g., occupation.

### **3.3 Type 3 – Tables for Use in Portraying Patterns of Allocation of Work Outputs Within Sub-Categories of a Specific Destination**

Sections 3.1 and 3.2 have dealt with auxiliary tables that serve to elaborate aspects of the sources of work outputs. For some purposes, it will be important to gain a detailed view of the way that work output is distributed among parts of a given destination. Tables that allow this view fall into the class of Type 3.

Auxiliary tables of Type 3 allow specific destinations (columns) of the core table to be expanded. The column that deals with child-care related services, for example, can be expanded in a auxiliary table that shows a classification of children into meaningful subgroups. Similarly, the columns that deals with paid-work outputs to business and other organizations can be expanded in a auxiliary table that shows a classification of these organizations into industrial groups. Data

presented in Chapter 4 contain an illustration of the latter kind of breakdown of paid-work outputs among the recipient business and government organizations.

Certain combinations of Type 2 and Type 3 auxiliary tables can also be useful. A simultaneous breakdown of Job-Family Obligations Groups by Occupation (Type 2) along with display of the patterns of their work outputs over several destinations including detailed industry groups (Type 3) would facilitate the development of new insights into the application of labour in industrial production (see, e.g., Stone and Bulmer 1994). It would simultaneously support study of the adaptations made by certain key groups to their joint family and job obligations, and the impacts of those adaptations upon their potential for experiencing time-stress (see Frederick 1993) or their access to time for pursuing new educational and training opportunities.





## Chapter 4

# Statistical Indicators: Definitions and Potential Uses

The top level of the hierarchy of data in the TWAS is comprised of key statistical indicators. These measures are computable from the TWAS tables to serve as vehicles for the delivery of summary information pertinent to issues of broad public concern. Series will be generated for each indicator. The notion of 'series' here includes variations over major regional and other sub-population units at a point in time, as well as variation over time. The display and analysis of major sub-group variation in the values of key indicators (illustrated in data presented below) is a key objective of TWAS development.

The currently identified set of indicators includes the following: Work Load Index, Weighted Unpaid Work Output Index, Unpaid Work Intensity Index, Weighted Paid Work Output Index, Paid Work Intensity Index. Three of these indices (figures shown in Columns C, D and E of Table 4.1) will be subjects of detailed discussion below. Others for which illustrative data and discussion are provided below include a measure of the extent to which time on the job involves active production of outputs, and a measure of extent to which time budgets are used in doing unpaid child-oriented work. Still other indices will only be mentioned briefly below, including an Adult-Support Ratio, a measure of proportion of time budgets used in providing unpaid work on behalf of organizations, and a measure called "Total Work Output Per Recipient" for a specific class of recipients such as children.

## 4.1 Work Load Index

The Work Load Index (WLI) represents the share of time devoted each day to work of economic value in the total time available to an individual, on a daily basis. This indicator can be used to obtain a first impression of the economic contributions of the different population groups when both unpaid and paid work are taken into account. It can also be used to gauge the share of

time that remains to such groups for other activities such as training, leisure, meals, and sleep. Table 4.1 shows Work Load Index scores for selected Job-Family Obligations Groups.

*Groups with a high WLI.* The groups with the highest WLI values in Table 4.1 are the following:

- women aged 20-44 years, with spouse, at least one preschool age child at home and working full-time: WLI = 46.7
- women aged 20-44 years, with spouse, at least one other child (none of preschool age) at home and working full-time: WLI = 45.1
- men aged 20-44 years, with spouse, at least one preschool age child at home and working full-time: WLI = 45.0
- women aged 45-64 years, with spouse, without children and working full-time: WLI = 44.8

By way of comparison, the lowest indexes have values of around 18-19 and concern those that have few family responsibilities (i.e. no spouse or no preschool age child, or neither) and do not have a full-time job.

The figure of 46.7 cited above means that among married women aged 20-44 years who have at least one preschool age child at home and a full-time job, close to one-half of each 24-hour day, on average, is spent doing work of economic value. Not counted in this index are the times they need for essential activities such as sleeping. Also excluded are the times they spend doing other kinds of productive work such as education. If these times were taken into account, it would be readily apparent that they have relatively little time for leisure. (For related discussion see Schor 1991.)

The implications of such high WLI scores as those shown for the four groups mentioned above are worthy of note. Below, we examine some that seem particularly important for today's Canadian society.

*Training* helps employees improve their personal productivity and adaptability. That improvement benefits employers. Some employers that have need of increasingly qualified labour to face competition will obtain worthwhile returns from investment in staff training. The very high WLI

Table 4.1  
**Work Load Indexes for Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, Canada, 1992**

Group No. <sup>1</sup>	Job-family obligations group		Total work-output days	Other work-related days <sup>2</sup>	Work load intensity index <sup>3</sup>	Weighted paid work to total output index <sup>4</sup>	Weighted unpaid work to total output index <sup>5</sup>
			A	B	C	D	E
			'000s	'000s			
<b>Age 20-44</b>							
<b>Living with a spouse/partner and</b>							
A preschool child of respondent at home:							
1	Employed full time	Female	196	15	46.7	18.8	28.1
7		Male	464	47	45.0	27.0	18.2
2	Not employed full time	Female	323	4	39.0	2.1	37.2
8		Male	51	1	26.8	3.2	23.1
A child of respondent (above preschool age) at home – no preschool child of respondent at home:							
3	Employed full time	Female	349	29	45.1	20.8	24.3
9		Male	402	42	42.4	27.4	15.1
4	Not employed full time	Female	234	4	33.6	3.3	30.4
10		Male	26	0	19.3	0.7	17.8
No child of respondent at home:							
5	Employed full time	Female	260	28	41.4	25.5	15.8
11		Male	282	34	41.5	28.8	12.8
6	Not employed full time	Female	98	3	29.4	3.9	25.5
12		Male	29	2	18.7	4.5	13.5
<b>Living with others (no spouse/partner at home)</b>							
A preschool child of respondent at home:							
13	Employed full time	Female	22	2	41.4	18.8	24.5
14	Not employed full time	Female	40	0	35.7	1.8	33.9
<b>Age 45-64</b>							
<b>Living with a spouse/partner</b>							
No child of respondent at home:							
31	Employed full time	Female	217	21	44.8	24.0	20.9
35		Male	349	40	40.4	27.9	12.5
32	Not employed full time	Female	315	4	28.1	2.1	25.9
36		Male	105	0	19.3	0.6	18.8
A child (aged less than 19) of respondent at home							
		Female	159	7	38.4	12.3	26.3
		Male	265	26	37.9	20.4	17.3

See footnotes at the end of the table.



Table 4.1  
**Work Load Indexes for Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, Canada, 1992 – Concluded**

Job-family obligations group			Total work-output days	Other work-related days <sup>2</sup>	Work load intensity index <sup>3</sup>	Weighted paid work to total output index <sup>4</sup>	Weighted unpaid work to total output index <sup>5</sup>
Group No. <sup>1</sup>			A	B	C	D	E
			'000s	'000s			
<b>Age 45-64</b>							
<b>Living alone</b>							
No child of respondent at home:							
45	Employed full time	Female	55	5	39.7	21.7	18.1
47		Male	64	7	37.8	25.4	11.8
46	Not employed full time	Female	40	0	22.2	0.6	22.2
48		Male	19	0	18.4	0.0	17.5
<b>Age 20-64</b>							
<b>Living with others (no spouse/partner at home)</b>							
A child (aged less than 19) of respondent at home <sup>6</sup>							
		Female	197	10	37.2	10.8	26.4
		Male	32	2	35.8	15.7	20.1
A parent of respondent at home							
		Female	151	14	32.0	16.7	15.0
		Male	218	25	27.4	18.6	8.7
<b>Age 65 and over</b>							
Living with a spouse/partner – no child of respondent at home							
		Female	190	0	24.8	0.4	24.6
		Male	180	2	20.2	2.4	17.7
Living with others (no spouse/partner or child of respondent at home)							
		Female	38	0	20.7	0.0	20.7
Living alone – no child of respondent at home							
		Female	148	0	19.7	0.7	18.8
		Male	54	0	18.1	1.7	15.7

<sup>1</sup> Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1.

<sup>2</sup> Included here is time that is pre-empted in the effort to provide work outputs – e.g. travel to job, idle time on the job, meals (here we include home manager's meals).

<sup>3</sup> Sum of columns A and B, divided by grand total days for ALL activity episodes, and expressed as a percentage.

<sup>4</sup> Proportion of total work-output time devoted to paid work, weighted by the work load intensity index.

<sup>5</sup> Proportion of total work-output time devoted to unpaid work, weighted by the work load intensity index.

<sup>6</sup> The lines for age group 20-64 sometimes included data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).

values shown for the above-mentioned four groups suggest that for these groups there remains little time available for training, unless that is done during work hours.

Therefore, some groups that already have a very high level of WLI could be penalized with regard to training. It would be important to study their situation in a more detailed manner so as to search for solutions adapted to their needs, either on behalf of employers or on the parts of public authorities and educational institutions. As an example there are forms of work sharing, where employees obtain credits in terms of time which they can use to improve their training. Equally, new technologies of training may allow training at home.

With regard to the quality of personal and family life, a high level of WLI entails, theoretically, benefits as well as costs. In term of benefits, it means that families where both spouses have a high WLI can have a significant economic surplus. On the other side of the coin, however, they might have a decline in the quality of personal and family life, as much for the parents as for the children. A very high WLI attracts our attention to the time pressure that individuals can experience (see Frederick 1993 and Frederick 1995). Measured on a scale of 0 to 10, this pressure has been estimated at 5.5 for women with a child of less than 2 years old and 3.9 for men in the same situation (Statistics Canada 1994).

However, to better interpret these data it is necessary to examine in a more detailed manner the components of the total work load for each group. Thanks to the design of the core table, this can be done in terms of the distribution of the work load over different classes of recipients. It could indeed be that the stress results partly from the diversity of the recipients, and therefore the variety of demands upon a person's time, as well as from the level of the work load. (To a small degree, this question can be pursued by correlating information from the core table with data on respondents' reports about their sense of being 'time crunched'. For analysis of data from such reports see Frederick 1993.)

Where both spouses in a family have very high WLI scores, it may imply that the available time for family activities, with the exception of

household production activities, is reduced (Presser 1989). This question cannot be explored from the available data because data to compute spouses' WLI scores are not available. One thing that can be done is to display WLI scores for groups where the spouse is known to have a full-time job. This is done in Table 4.2.

Among the four groups cited above, having a spouse who has a full-time job is associated with an increased WLI, compared to the average. Among women aged 20-44 years with a full-time job, and with a husband that has a full-time job as well as at least one preschool age child at home, the WLI stands at 47.2. The figure for all such women, irrespective of the spouses' employment status, is 46.7. Among the male counterparts of these women, the average is 45.0 and the figure for those where the wife has a full-time job is 46.2. Thus, for both men and women, having a spouse with a full-time job is associated with a higher than average WLI.

One sees an even sharper difference among women aged 45-64 years, with spouse, without children but with full-time job. If the husband also has a full-time job the WLI score is 46.9, which is more than two percentage points above the figure for all such women aged 45-64 regardless of the husband's employment status (WLI of 44.8). Since the WLI represents an approximate percentage of a 24-hour day, this means nearly an extra half an hour of work of economic value per day for these women whose husbands also had a full-time job.

We have illustrated here the advantage of an indicator such as the WLI for questions related to training and quality of life. However, areas for additional uses of such an indicator exist. They include the demand for goods and services that will make household work easier, the supply of volunteer work, and the demand for leisure services that require little in terms of travel time and which can include all members of the family.

## 4.2 Weighted Unpaid Work Output Index

The Weighted Unpaid Work Output Index (UWI) is the percentage of the total work load comprised of unpaid work, multiplied by the value of the Total Work Load Index. The weight allows the index to

Table 4.2

**Work Load Indexes for Work of Economic Value Done by Groups with Varying Degrees of Job-Family Obligations, for Persons Whose Spouses Did Paid Work for 30 or More Hours Per Week, Canada, 1992**

Group No. <sup>1</sup>	Job-family obligations group		Total work-output days	Other work-related days <sup>2</sup>	Work load intensity index <sup>3</sup>	Weighted paid work to total output index <sup>4</sup>	Weighted unpaid work to total output index <sup>5</sup>
			A	B	C	D	E
			'000s	'000s			
	<b>Age 20-44</b>						
	<b>Living with a spouse/partner and</b>						
	A preschool child of respondent at home:						
1	Employed full time	Female	168	14	47.2	19.6	27.5
7		Male	143	15	46.2	27.1	19.1
2	Not employed full time		255	3	40.6	2.2	38.4
8		Male	16	0	31.4	5.9	25.5
	A child of respondent (above preschool age) at home – no preschool child of respondent at home:						
3	Employed full time	Female	295	23	45.1	20.5	24.5
9		Male	183	19	43.7	27.7	15.8
4	Not employed full time		175	3	35.1	3.8	31.1
10		Male	8	0	17.8	0.0	17.8
	No child of respondent at home:						
5	Employed full time	Female	198	23	42.5	26.8	15.9
11		Male	190	22	43.2	30.0	12.7
6	Not employed full time		71	2	31.3	4.0	27.4
12		Male	23	2	24.5	7.5	16.0
	<b>Age 45-64</b>						
	<b>Living with a spouse/partner</b>						
	A child (aged less than 19) of respondent at home:						
29	Employed full time	Female	81	5	41.7	20.6	21.1
30	Not employed full time	Female	47	1	36.4	4.6	31.7
	No child of respondent at home:						
31	Employed full time	Female	159	16	46.9	26.9	20.1
35		Male	117	15	42.3	28.9	13.7
32	Not employed full time		127	2	29.7	3.0	26.7
36		Male	29	0	29.3	2.0	26.3
	A child (aged less than 19) of respondent at home						
		Female	128	6	39.6	14.2	25.4
		Male	92	8	35.6	17.8	18.6
	<b>Age 65 and over</b>						
	<b>Living with a spouse/partner</b>						
	No child of respondent at home:						
56	Not employed full time	Female	5	0	21.7	0.0	21.7
60		Male	2	0	11.1	0.0	11.1

1 Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1.

2 Included here is time that is pre-empted in the effort to provide work outputs – e.g. travel to job, idle time on the job, meals (here we include home manager's meals).

3 Sum of columns A and B, divided by grand total days for ALL activity episodes, and expressed as a percentage.

4 Proportion of total work-output time devoted to paid work, weighted by the work load intensity index.

5 Proportion of total work-output time devoted to unpaid work, weighted by the work load intensity index.

6 The lines for age group 20-64 sometimes included data for lines shown earlier in the table.

Source: 1992 General Social Survey microdata files (Statistics Canada).



take into account the overall size of the total work load in the total time budget. A group with a very low overall weight cannot score highly on the UWI even if nearly all its work output is unpaid, as a result of the use of the weight. The resulting figures are shown in column E of Table 4.1.

A related index, for which data are not shown here, is the Unpaid Work Intensity Index. It represents the share of time committed to unpaid work in the totality of individuals' available time *after* deducting time spent for paid work and for necessary activities such as sleep. In other words, after we remove the time spent on activities that represent either highly committed time or time for paid-work, what is the weight of unpaid work within the time spent for all *other* activities?

Scores on this index can be readily computed from the core table and from other information in the microdata file that underlies the core table. The use of these scores should, however, be made in the light of a discussion of the suggestion, in the definition, that paid work has priority to the extent that it may be regarded as time committed *ahead* of that used for unpaid work. That is a controversial idea; because it may represent the situation of some persons but not of others. For a large set of persons it is probably not correct to suggest that their paid-work time has priority over their unpaid-work time.

The interest in both indicators just mentioned is to highlight the generally invisible and often unquantified part of economic activity that takes place outside paid labour markets. An examination of variation in the value of the UWI among the Job-Family Obligations Groups indicates that the following groups are at the top of list:

- women aged 20-44 years, with spouse, at least one preschool age child and not working full-time: UWI = 37.2
- women aged 20-44 years, living with others (no spouse), having at least one preschool age child and not working full-time: UWI = 33.9
- women aged 20-44 years, with spouse, at least one other child (none of preschool age) and not working full-time: UWI = 30.4
- women aged 20-44 years, with spouse, at least one preschool age child and working full-time: UWI = 28.1

These four groups have some common features: gender and age group are the same. In three of four cases, there is a spouse, preschool age children and the fact of not working full-time. In contrast, the four groups having the weakest UWI, that is to say varying between 11.8 and 13.5, are men without children (all cases) living with a spouse and working full-time (3 of 4 cases).

Consequently, what emerges is that gender, the presence of children, notably preschool age children, and employment status may be very influential in determining the value of the UWI. A number of significant implications may be noted as follows.

*Household responsibilities.* In 1992, despite the high level of women's integration in the labour market, they continued to be the principal doers of non-paid activities, most notably of the household chores. This emerges from a comparison of the UWI of groups having the same demographic and paid-work profiles except for gender. For example if one compares men and women with a spouse, preschool age child and without full-time work, respective values of the UWI are 23.1 and 37.2. Similarly men and women with a spouse, preschool age child and a full time job have respectively an UWI of 18.2 and 28.1. Although disaggregated data indicate that men's contribution increases when their spouses work full-time (see also Marshall 1993), women with children, notably those of preschool age, continue to be the principal doers of domestic tasks.

For women, notably mothers of preschool age children, there is a minimum level of unpaid work. The implications for balancing job and family obligations of certain groups of workers become important in the light of the results of this kind of analysis. The job-family balancing task could be particularly difficult for women that occupy management positions (see Stone 1994 and Stone and Bulmer 1994) or for workers in sectors subject to major seasonal increases in the volume of paid work. Table 4.3 shows total work load and UWI scores for six groups of employed managers.

Table 4.3 also shows estimates of how the work of economic value was distributed in 1992 among four classes of recipient of the work output, for the six groups of managers. The six groups of managers are all aged 20-44 (samples of similar

**Table 4.3**  
**Average Work Hours Per Person Per 24-Hour Day, by Class of Recipient of the Output,**  
**for Selected Groups of Employed Managers, Canada, 1992**

Group No.	Job-family obligations group	Paid work indus. & govt.	Unpaid work bus. & vol.	Child-oriented work	Unpaid household work	Total hours of work of economic value per person per day	Persons <sup>1</sup>	Work load intensity index <sup>2</sup>	Weighted paid work to total output index <sup>3</sup>	Weighted unpaid work to total output index <sup>4</sup>
Age 20-44										
Living with a spouse/partner and										
A preschool child of respondent at home:										
1	Employed full time	Female 5.8	0.5	2.9	2.4	11.5	47	52.0	26.0	26.0
7		Male 6.3	0.0	1.3	3.0	10.6	153	45.8	27.6	18.8
A child of respondent (above preschool age) at home:										
3	Employed full time	Female 4.7	0.3	1.2	4.1	10.3	72	46.8	21.3	25.5
9		Male 6.1	0.0	0.7	2.6	9.4	200	42.9	27.9	15.0
No child of respondent at home:										
5	Employed full time	Female 5.8	0.0	0.0	3.4	9.1	45	48.0	27.4	16.0
11		Male 5.2	0.0	0.0	3.2	8.4	69	37.8	23.3	14.6

1 Each category number refers to a specific Job-Family Obligations Group. See the corresponding numbers in Table 2.1.

2 Includes the total hours plus time committed because of work obligations – e.g., commuting.

3 Proportion of total work-output time devoted to paid work, weighted by the work load intensity index.

4 Proportion of total work-output time devoted to unpaid work, weighted by the work load intensity index.

Source: 1992 General Social Survey microdata files (Statistics Canada).

groups above age 44 are too small to yield reliable data), have a spouse at home, and work for pay at least 30 hours per week. Three of the groups are men, and three are women. Each sex group is broken down according to the presence of the respondents' children in the home (preschool child in the home, other child but no preschoolers at home, and no children at home).

Businesses, not-for-profit organizations, children, spouse, other family members, other relatives and friends are represented in Table 4.3 among the classes of recipient of person-work outputs. (Spouse, other family members, other relatives and friends are aggregated under the heading "Unpaid household work" in Table 4.3.) The figures for hours per person per day in this table are on a seven-day-week basis, to facilitate comparison between paid and unpaid work of economic value.

Leading the six selected groups of younger managers in total hours per person per day spent doing work of economic value in 1992 were women with a spouse at home, a full-time job as a manager and a preschool child. For these people, on average, more than 11 hours out of their 24-hour time budgets were spent doing work of economic value. If we add to those hours the time committed by paid work but in which work output is not taking place (e.g., commuting time), we get an average of about 52% of the time budgets of these women as a group. This 52% is the Total Work Load Index, and it is the highest value of the index displayed so far in this discussion. The male counterparts of these women, as well as women managers with a non-preschool child at home, were significantly behind, with a figure of over 10 hours per person per day (on a seven-day week basis).

There are small percentages of women managers with daily hours of work of economic value well above the averages just cited. For example, about 8% spent more than 13 hours per day doing work of economic value. About 3% spent at least 15 hours per day in the same effort. (The data are not shown here but are available from the senior author.) If one adds the hours of sleeping and eating to these groups' time, it is apparent that they had very little opportunity for leisure, even on the basis of seven days per week.

The one-hour difference between men and women in these groups of managers that had a child at home, as regards total time spent doing work of economic value (see Table 4.3) largely reflects child care. Women managers, with a preschool child at home (line 1 in Table 4.3) spent 2.9 hours per person per day doing work of economic value whose output was used by their children, while male managers, with a preschool child at home (see line 2 in Table 4.3) spent 1.3 hour per person per day in similar work. The two groups had more similar numbers of hours per person per day spent doing market work for a business, for government or for business purposes (6.3 hours for males and 5.8 hours for females).

With home-to-work commuting, all meals and rest breaks, and all time for essential sleep excluded from these figures, it is not unreasonable to suggest that substantial percentages of these managers work under heavy pressure on their time. To the extent that employers make large investments in training and development of these groups, their concern with employees' use of time on the job can be expanded to include a concern for the stresses these employees face from all the work of economic value that they perform.

*Unpaid work among seniors.* Values of the UWI for persons of aged 65 years and more vary between 15.7 and 24.6. In this age range, the highest values are attributable to women living with a spouse or with other persons. Note that even if the two spouses no longer work and no longer have children in the home, the gender gap in the contribution to domestic tasks remains: UWI = 24.6 for women with spouse and UWI = 17.7 for men in the same situation.

Moreover when one compares the UWI of those aged 45-64 years to that of those aged 65 years and over one observes an increase from one age group to the other. The UWI is 12.5 for men aged 45-64, with spouse, without child and working full-time. This index rises to 17.7 for males 65 years of age and over with spouse and without full-time work. For women in comparable situations the corresponding numbers are 20.9 and 24.6. These increases directly reflect the decrease of paid work with the move from age 45-64 to 65 or more. They may also reflect, though only indirectly, a potential for contribution to paid economic activity for persons aged 65 years and



more. This may become relevant to public debates given the increase in life expectancy and the possible reduced access to transfer income among the elderly.

*Compensation for contribution to necessary non-market activities.* The UWI allows us to compare groups' contributions of unpaid work of economic value at different stages in life measured by age, the presence of children, and employment status. Inter-group variation in values of the UWI may be used to support discussions of monetary compensation for contribution to valuable non-market activities.

### 4.3 Weighted Paid Work Output Index

The Weighted Paid Work Output Index (PWI) is the percentage share of the total work load comprised of paid work, weighted (i.e. multiplied) by the value of the Total Work Load Index. The weight allows the index to take into account the overall weight of the total work load in the total time budget. Figures for this index are in column D of Table 4.1.

Although paid work constitutes the central object of a great number of statistical series, the interest of a new measure such as that of the PWI is that it facilitates placing paid work in relation to the totality of the time spent doing work of economic value. This helps analysts to better understand the interdependencies between paid and unpaid economic activity.

When one classifies the PWI by order of decreasing value one observes that the first four groups are the following:

- men of 20-44 years of age with a spouse, without child and working full-time: PWI = 28.8
- men of 45-64 years of age with spouse, without child and working full-time: PWI = 27.9
- men of 20-44 years of age with spouse, at least one child above preschool age and working full-time: PWI = 27.4
- men of 20-44 years of age with spouse, at least one preschool age and working full time: PWI = 27.0

One observes a consistency among these groups since they are men with spouse and full-time work. Only one group represents men with a preschool age child.

The comparative examination of certain groups' index values helps one to grasp the interdependence between paid and non-paid work. If one compares the PWI of full-time workers according to gender, the presence and age of children, one observes that the presence and age of children is associated with reduced paid work for women but not for men. This influence is manifested on several dimensions of women's labour market participation – higher incidence of part-time work due to family responsibilities, career interruptions due to maternity and to the difficulties in balancing paid work and family obligations. These in turn reverberate in the long term on the incomes of women (OECD 1994). By facilitating the observation of some aspects of the interdependence between paid and unpaid work of economic value, analysis of the pattern of inter-group variation in the PWI could be useful for large enterprises that want to improve the targeting of their programs designed to make balancing of job and family obligations a less difficult task for many workers. (For related discussion see Stone 1994.)

The PWI can be used to explore aspects of industrial variation in the use of labour inputs. PWI values for different industries can be computed for persons employed full-time and who have specific combinations of socio-demographic attributes. These attributes would include occupation. Thus, for the full-time employees in a given occupation group and a specific Job-Family Obligations Group, it is possible to compute  $n$  PWI values for  $n$  industry groups. The pattern of variation among these  $n$  PWI values provides a perspective on industry-group differences in the use of labour that supplements that which can be obtained from the more conventional labour force survey.

Another perspective on industrial variations in the use of labour is provided by breaking down the PWI into (a) one part that covers time spent by workers in actually producing services on the job and (b) a second part that deals with time spent in other activities while on the job. These other

activities would include meal breaks, rest periods, idle periods, and waiting times. This disaggregation of the PWI gives rise to another indicator which we call the “*Market-work Input Ratio*”. This is the ratio of time spent actually creating a product or a service on the job to total time committed as a result of having a paid job.

There is significant industry-group variation in the pattern of time use on the job (see Stone and Bulmer 1994). While reporting on these variations below, we do not wish to convey the impression that the figures allow one to rate industry groups according to how productively their workers use time on the job. Each occupation has its own requirements or patterns regarding time use on the job. Each industry has a unique mix of occupations. Even within a single occupation, one industry might be much more effective than another in combining technological advances with labour input in ways that influence the pattern of time use on the job. The prevalence of collective agreements in an industry is also a key factor. Thus the industrial variations in time use on the job may be viewed as characteristic differences among industry groups’ workers as regards one aspect of their patterns of economic activity.

Although the figures do not support any effort to rate or evaluate the industry groups’ patterns of use of time on the job, they might serve as benchmarks for leaders within a specific industry group. It may be possible to use these benchmarks as supporting information in assessing performance in specific segments of the industry.

In this discussion, “time on the job” for paid work done away from home means the time that starts when the worker arrives at the work place and ends when he or she leaves the work place. For paid work done at home, “time on the job” means a period that starts when an activity that is part of the process of making paid work outputs begins and ends when such activity is stopped. For the person who normally works for pay or as a business owner in the home, meals and break periods during the work day should, however, be treated as being time on the job, so that the data can be comparable to those who eat meals at a work place away from home.

Since the industry groups differ in their occupational mixes, occupation should be held

constant while studying industrial variations in the Market-work Input Ratio. Table 4.4 provides illustrative data for Managers.

Managers have a longer than average day on the job and spend a lower percentage, on average, of their paid work day having meal or rest breaks (see Chart 4.1). Aggregating all managers into one group, their average work day is approximately 40 minutes above the average for all full-time workers in 1992, 9.2 hours versus the global average of 8.5 hours (on a five-day week basis). This result is consistent with an earlier study by Duxbury, L. et al. (1992).

Average times on the job were close to or above 10 hours for managers in Primary Industries other than Agriculture, Manufacturing of Non-Durable Goods, Retail Trade, Personal Services and Public Administration. These figures exclude commuting time. Moreover, since these are just averages, they imply that a substantial proportion of this occupational grouping had daily times on the job well in excess of 10 hours/day per five-day work-week.

The industry groups whose managers had the lowest percentages of time on the job used for meal or rest breaks were Agriculture and Other Primary Industries (each below 1%), Construction (1%), Transportation (3%) and Manufacturing of Durable Goods (4%). Note that while all workers in Manufacturing of Durable Goods had one of the highest percentages (9%) of time on the job used for meal and rest breaks, this group had one of the lowest percentages (4%) when only managers were considered in the calculation. (A table containing these data is available from the senior author.)

A related index is the Paid-work Intensity Index – the ratio of time spent producing paid work to time spent on all ‘discretionary’ activities (an activity such a sleep would be considered non-discretionary). Variations in this measure over key population sub-groups and in the same group over time could significantly supplement the employment-to-population ratio and the unemployment rate as measures of the level of labour inputs in the market economy. The long-term trend in this measure could signal important structural change that could create increased pressure upon the traditional criteria for legitimate



**Table 4.4**  
**Selected Indicators of Time Use on the Job, Employed Managers, by Broad Industry Group, Canada 1992**

Industry group	Percentage distribution of time at work over alternative activities <sup>1</sup>					Market work intensity index <sup>2</sup>	Paid work hours on a five-day week basis <sup>3</sup>
	Producing	Delays	Breaks	B + C	Total		
	A	B	C				
Grand total	91.8	2.4	5.7	8.2	100	31.2	9.2
Agricultural	99.1	0.0	0.9	0.9	100	24.4	8.0
Other primary	99.4	0.0	0.6	0.6	100	34.1	10.5
Manufacturing/non-durable	88.9	4.9	6.2	11.1	100	34.4	9.8
Manufacturing/durable	93.0	3.4	3.5	6.9	100	27.3	8.5
Construction	96.0	2.8	1.3	4.1	100	31.5	9.6
Transportation	96.9	0.0	3.1	3.1	100	29.4	8.5
Wholesale trade	92.5	2.7	4.8	7.5	100	28.8	8.5
Retail trade	92.7	0.7	6.6	7.3	100	33.3	9.8
Finance	93.8	0.3	5.9	6.2	100	30.3	8.8
Community services	86.9	8.2	4.8	13.0	100	29.1	8.8
Personal services	94.1	1.5	4.4	5.9	100	35.7	10.8
Business services	90.6	2.6	6.9	9.5	100	30.7	8.8
Public administration	90.8	2.0	7.2	9.2	100	34.3	9.8

<sup>1</sup> "Producing" is assigned to the following activities: work for pay, overtime work.

<Delays> is assigned to the following activities: travel during work, waiting/delays at work, other work activity.

<Breaks> is assigned to the following activities: meals, snacks at work, idle time before/after work, coffee/other breaks.

<sup>2</sup> Approximately the percentage of the worker's 24-hour day that is spent on the job or traveling to and from work.

<sup>3</sup> Excludes commuting time.

Source: 1992 General Social Survey (Statistics Canada).

access to benefits from the flow of money income in the society. However, no figures for this measure are shown in this book. The pattern of its inter-group variation would be highly correlated with that in the PWI.

In the same manner that indexes can be devised to highlight aspects of time spent in paid work, indexes can also be developed regarding features of unpaid work. Two areas of particular interest from the viewpoint of public policies and social support are child care and adult support.

#### 4.4 Index of Child-Focussed Time

The Index of Child-Focussed Time is the proportion of total time devoted to child-oriented work outputs. This index may be further broken down into Primary Child-Focussed Time and Secondary Child-Focussed Time. Primary Child-Focussed Time is the time where children are the primary focus of attention, and it includes all the time respondents would report as falling under

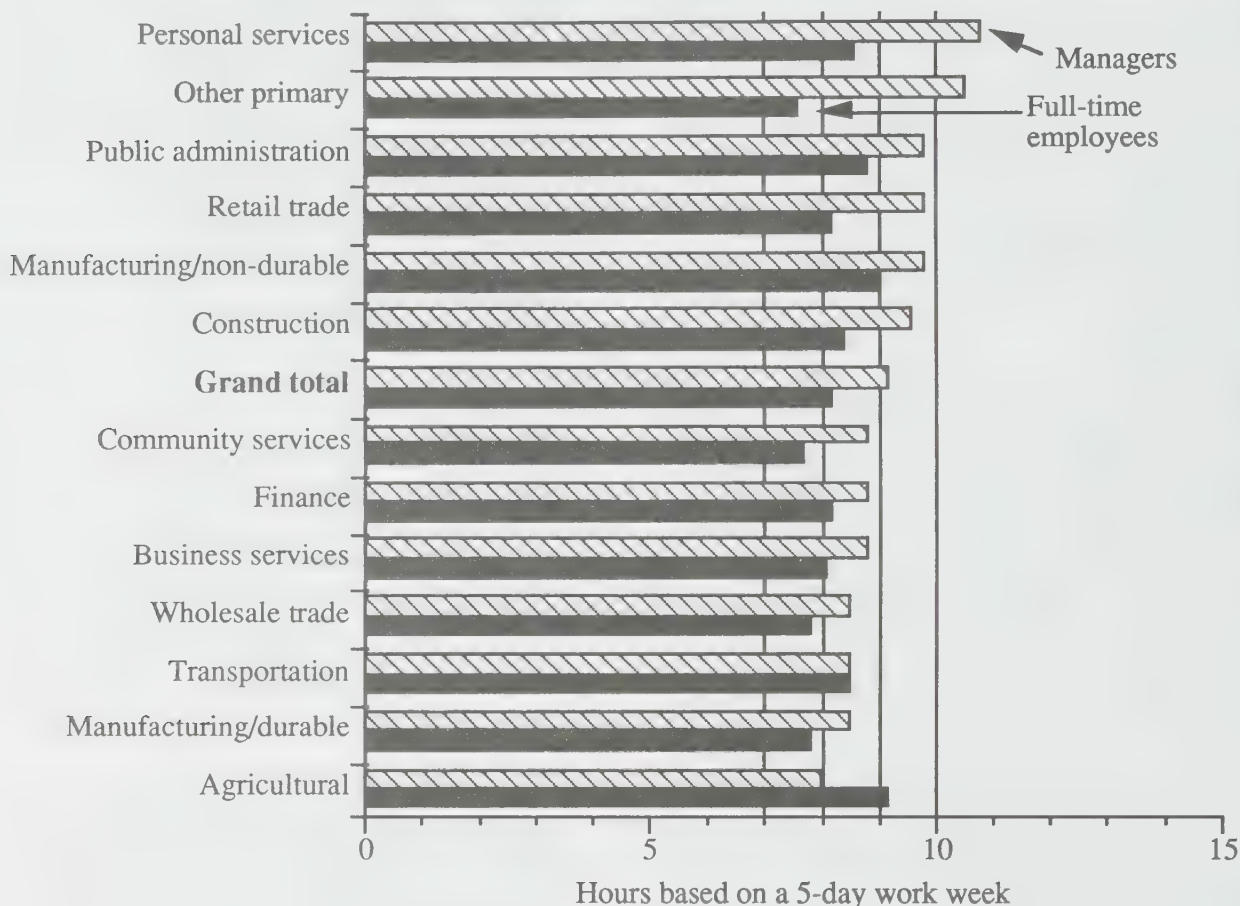
the heading of child care or nurturing. Secondary Child-Focussed Time is time spent on work outputs while in contact with a child but where the child may not be the focus of attention (e.g., preparing meals while in contact with a child). For all of these ratios, the denominator is the total time budget of the respondent group. Analysis would be focussed on variations in the ratio among key socio-demographic groups; e.g., among selected Job-Family Obligations Groups.

Data from the Total Work Accounts System allow one to estimate the total volume of time spent in child-oriented work of economic value by all groups. This figure can be expressed as a percentage of the total time budget of all persons that had children in their homes. The aggregate of these persons spent 15% of their time budgets on child-oriented work activities in 1992.

Four-fifths of this volume was contributed by just six of the Job-Family Obligations Groups identified in Table 2.1. These were the six groups



Chart 4.1

**Paid Work Hours Per Day for Managers and All Full-Time Employees, by Broad Industry Group, Canada, 1992**

Source: 1992 General Social Survey (Statistics Canada).

that ranked the highest in terms of the percentage of their time budgets spent in child-oriented work of economic value. They are called the "leading groups" below.

Chart 4.2 shows data for the groups that devoted the greatest proportions of their daily time budgets to such work in 1992 and in 1986 (the so-called "leading groups"). Among those with a preschool child at home, the highest percentages of time budgets spent in child oriented work were for women who did not have a full-time job. In 1992, women aged 20-44 with a preschool child at home, but with no spouse at home and no full-time job, spent 39% of their time budgets, on average, in

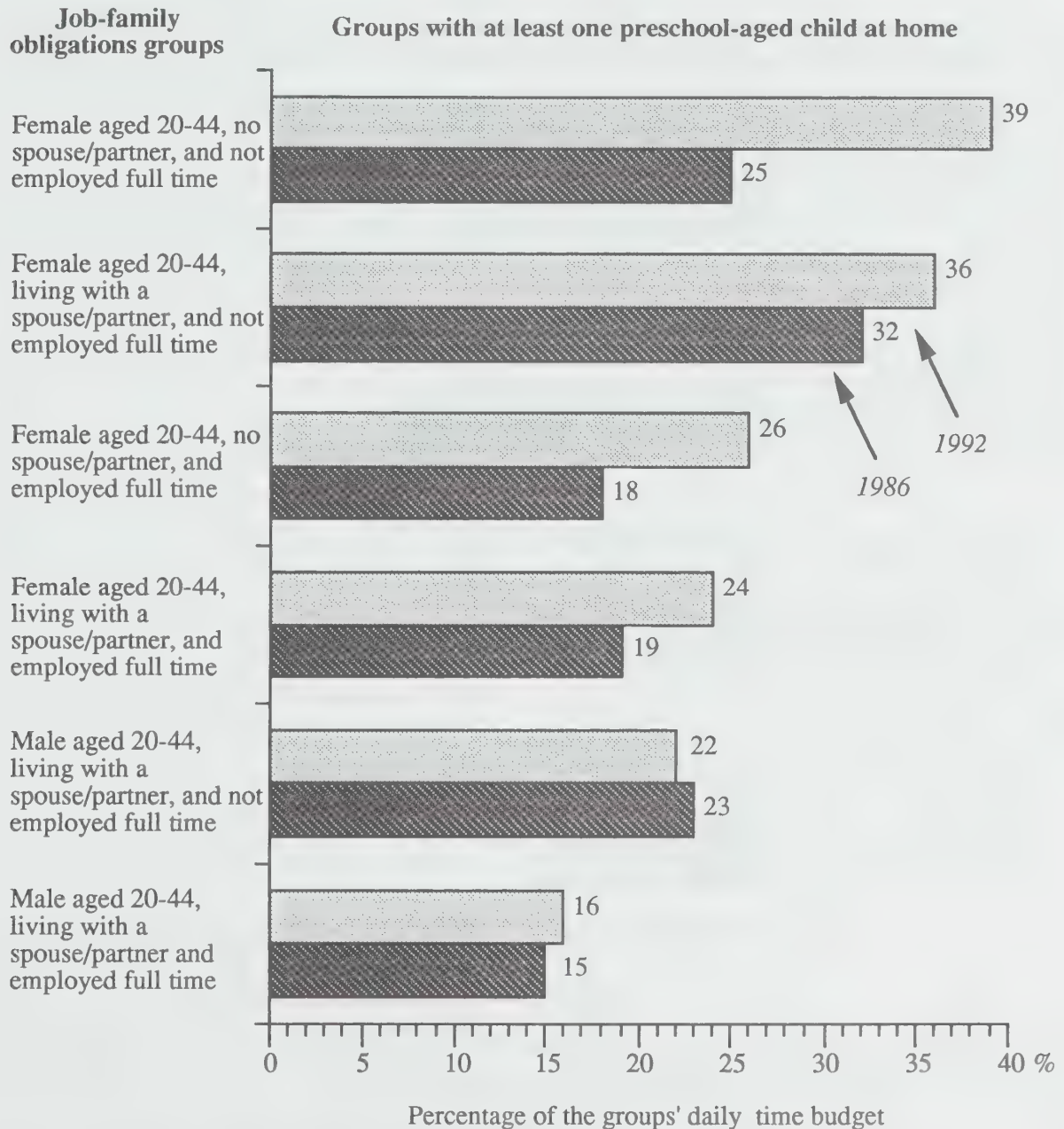
child-oriented work. The figure for their counterparts who did have a spouse at home was just slightly less at 36%.

The next highest groups in terms of use of time budgets for child-oriented work outputs were women aged 20-44 who did have a full-time job. For those with no spouse at home the figure was 26% in 1992. It was 24% for those who did have a spouse at home.

The gap between comparable groups of women with and without full-time jobs helps to cast light on the inter-dependence of market and non-market work among women. With the major movement

Chart 4.2

**Percentage of Time Budgets Spent Doing Child-Oriented Work of Economic Value for Leading Job-Family Obligations Groups,<sup>1</sup> Canada, 1986 and 1992**

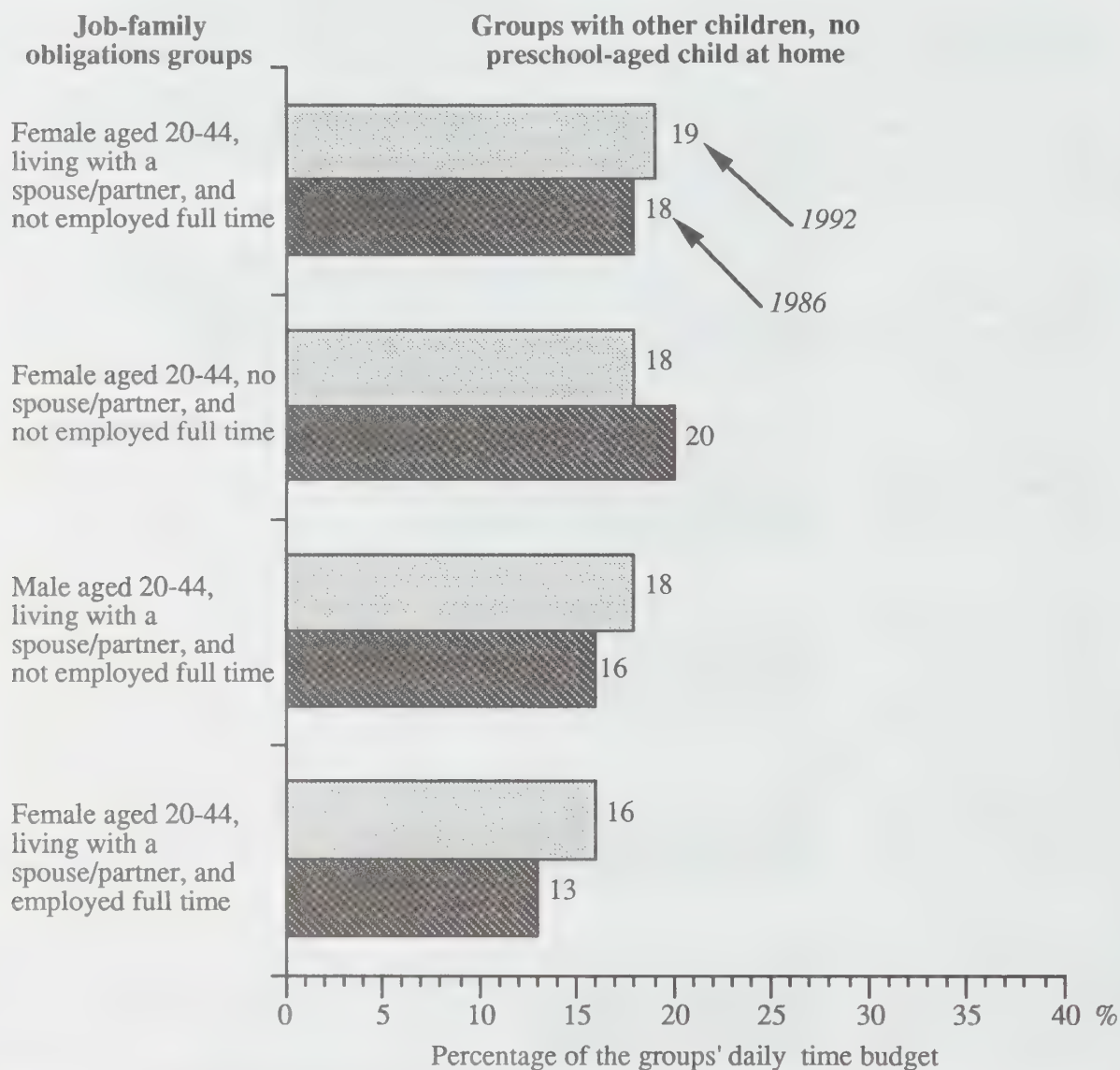


<sup>1</sup> The leading job-family obligations groups are those that spent 15% or more of their aggregate time budgets on child-oriented work of economic value in 1992.

Source: 1986 and 1992 General Social Surveys (Statistics Canada).

Chart 4.2

**Percentage of Time Budgets Spent Doing Child-Oriented Work of Economic Value for Leading Job-Family Obligations Groups,<sup>1</sup> Canada, 1986 and 1992 – Concluded**



<sup>1</sup> The leading job-family obligations groups are those that spent 15% or more of their aggregate time budgets on child-oriented work of economic value in 1992.

Source: 1986 and 1992 General Social Surveys (Statistics Canada).



of women into work-places outside the home over the last three decades, employer policies about the design of working environments and general labour market policies will be increasingly affected by information about this interdependence.

For those that had a preschool child at home, two of the six leading groups were comprised of men. Both groups were aged 20-44, had a spouse and a preschool child at home. The one that did not have a full-time job spent 22% of their time budgets, on average, in child-oriented work in 1992. Their counterparts with a full-time job spent 16% of their time budgets, on average, in child-oriented work in 1992.

## 4.5 Adult Support Index

An index analogous to the Index of Child-Focussed Time can be developed with regard to time spent providing care to adults – an Adult Support Index. This index relates the total time spent providing help to adults (or in domestic work for which adults other than the doer are beneficiaries) to the total time budget. Unfortunately, the latest round of the GSS time-use survey (that of 1992) did not gather information that allows one to specify whether the adult was a parent. However, several of the classified activities cite help being provided to adults. In addition, a large number of activities that probably provided work outputs were carried out in contact with the spouse, suggesting that either the spouse was a recipient of the work output or was a partner in producing the output (or both).

No data are provided for the Adult Support Index in this book. However, a study is underway, based partly on the TWAS, in which such data will be developed. This study will involve stochastic merging of records from the 1992 and 1990 General Social Surveys, so as to provide an enhanced basis for inferences as to when the recipient of the help given to an adult was a parent.

## 4.6 Other Indices

*Indices of unpaid work done on behalf of organizations*. Indices of unpaid work done on behalf of organizations can also be developed from the TWAS. These organizations include both

businesses and not-for-profit agencies. One use of these indices would be to analyze the extent to which cultural groups vary in their degrees of non-market work done mainly as a form of community support.

*Destination-specific total-work output per output-recipient*. So far the denominators of the indices have been drawn from the data about the people doing the work. Some useful indices might be devised by drawing upon numbers for the people in a specific class of work-output recipients. For example, as already noted, the total volume of time spent in child-oriented work activities can be estimates in TWAS. This can be transformed to yield a number of hours per child (recipient) per day. The pattern of change over time in this ratio could be a significant social indicator for the commitment of society to child-oriented work. However, it would be highly desirable to include paid child-oriented work and other organization-based services to children that tend to be missed in a household survey on time use.

In sum, a wide variety of indices can be derived from a statistical base comprised of the core and auxiliary tables and vectors of the TWAS. These indices are of potential interest in several sectors Canadian society. The next chapter will illustrate analysis of factors associated with the volume of total work output done by a population group, focussing on the influence of educational attainment upon the total productive work done by the unemployed.



## Chapter 5

## Use of TWAS Concepts and Data to Explore Some Potential Benefits of Increased Educational Activities Among the Unemployed

by Frank Jones, Ph.D.

Chapter 3 outlined a procedure for linking educational mobility to potential shifts in the pattern of work outputs for a particular Job-Family Obligations Group. It notes that educational mobility could be the result of policy initiatives. The media widely report a consideration of efforts to strengthen the links between access to public income supports and willingness to spend time in training and educational activities that may enhance one's prospects of finding paid work. This chapter demonstrates how TWAS concepts and data may be used to develop information pertinent to the current debates.

This chapter provides information that can be used to examine implications of differences in the level of education and training among sub-groups of the unemployed.<sup>7</sup> These differences suggest that increased investments in human capital by the unemployed might entail particular costs and benefits, though hypotheses about the effects of such increases would need to be addressed using longitudinal data, which are unavailable for this study.<sup>8</sup>

In this chapter the unemployed's availability of time for increased education and training is first investigated. Then some possible implications of differences in level of education among sub-groups of the unemployed are examined by considering the likely consequences of the different patterns of time use between the unemployed with a lot of education and those with little education. The data suggest that those with a lot of education spend a greater portion of their

time budgets doing work of economic value (mainly in the form of unpaid work) and other productive activities by comparison with those who have little education. This interpretation suggests that the achievement of higher levels of education among the unemployed might yield benefits to society beyond those that arise from improving their ability to find jobs.

The attainment of higher levels of education, however, involves going to school and increased study. This time may be regarded as a short-term cost in the sense that a greater commitment of the unemployed to learning activities would be associated with reductions in either work of economic value, other productive activities or leisure. In fact the data suggest that leisure is the activity most likely to be reduced when the unemployed take on learning activities. This interpretation suggests the hypothesis that increased investments in human capital by the unemployed will take place more at the expense of leisure than work of economic value, though longitudinal data would be needed to test this hypothesis.

In contrast to the bulk of the literature on this subject, benefits and costs are measured below in terms of time use rather than dollars. The idea that benefits and costs of increased investment in human capital by the unemployed can be addressed using time use data rather than data that deal with dollar valuation of the time used, merits some comment. Consider the time spent by parents to care for their children, for example. Hill and Stafford write:

"College-educated women, even those who work more than 20 hours per week in the labor market, manage to maintain the per-child levels of child care time (and incremental housework at reasonably high levels). If necessary, college-educated women will give up sleep to provide child care. Disaggregating child care into various components, which can be thought of as producing better qualitative measures of child care, we find that more-educated women spend more time playing with children, helping with the teaching of children, and in child-related travel. This greater variety in kinds of child care may be important for development."<sup>9</sup>

See end notes at the end of the publication.

See end notes at the end of the publication.



This quote draws attention to the nature of the opportunity cost *in terms of time* when women join the ranks of the employed – sleep is given up. It also suggests a benefit of college education – the children of college graduates receive higher quality attention, which is thought to be beneficial for child development. It would be very difficult, if not impossible, to put a defensible monetary value on such costs and benefits, given the present state of the art of economic science.

## 5.1 Hypotheses

The following discussion will explore related hypotheses concerning the development and training of the unemployed. Foremost among them are hypotheses that deal with aspects of the benefits of enhanced education among the unemployed, and with aspects of the societal costs of increased retraining activities by the unemployed. The initial hypothesis helps to lay the groundwork for the others by addressing the question of the availability of time for retraining among the unemployed within the context of their total work outputs, including their unpaid work.

A full understanding of the actual and potential role of education and training among the unemployed must be based on an analysis of both the benefits and costs of investment in human capital (IHC – refer to Appendix 5.1 for an explanation of the concept of human capital, and work of civic value mentioned in the next sentence). It must also take full account of the unemployed's involvement in all types of work of economic and civic value, and of their educational attainment. The following discussion will focus upon the population in the prime working age group of 25 to 54. The data will be TWAS-based estimates and other series based on the 1992 GSS.

The statistical hypotheses to be explored derive from three broad assertions. *First*, the opportunity to spend substantially more time on education and training is much greater for the unemployed than for the employed. *Second*, the potential benefit of increased education among the unemployed is large, both in terms of the quantity and quality of their productive activity. *Third*, the societal impact of increased education is small in the sense that the unemployed would expand their time spent in

education by reducing their leisure time, primarily, rather than by cutting back productive activity. (The notion of the unemployed's productive activity includes their unpaid work of economic value, work of civic value, and job search.) These assertions are expected to hold for each of the major Job-Family Obligation groups of unemployed persons defined in the TWAS. The text that follows will present statistical hypotheses based on these assertions. The hypotheses will be justified by an appeal to economic theory.

As the reader will have noted, the first assertion does not deal with the results of increased educational and training activities among the unemployed. It lays a foundation for hypotheses about those results by addressing the opportunities for such activities. This assertion leads to the following statistical hypotheses:

- (a) The quantity of time spent in leisure and rest per person day is greater for the unemployed than for *either* the employed, *or* those not in the labour force. We expect this hypothesis to be confirmed among the various TWAS Job-Family Obligations Groups.
- (b) In a regression equation that predicts the amount of personal time spent in leisure or rest from a set of explanatory variables, the coefficients for the employed and for those not in the labour force will be negative relative to that of the unemployed.

In the regression setup the unemployed are treated as a reference category of a dummy variable that deals with activity status (unemployed, employed, not in the labour force). The regression equation includes several other control variables, including ones used to define TWAS Job-Family Obligations Groups.

The economic rationale of this assertion is simply that without the requirement to do paid work each day, or to go to school, the unemployed have a considerable amount of extra time (compared to students and the employed). A large proportion of this time will be allocated to leisure. As for others not in the labour force, their decision arises from one or two sets of factors. The first set includes family obligations that consume time, economic conditions or personal values that make paid work

unattractive. The second set involves disability that inhibits work to the extent that it is not clear on the basis of economic reasoning that this group will have less leisure time than the unemployed.

Having established the extra time that the unemployed have for educational and training pursuits, our concern turns to aspects of the costs and benefits of time spent in investing in human capital, especially among the unemployed. With regard to the benefits, we have asserted that the potential benefit of higher education among the unemployed is large, both in terms of the quantity and quality of their productive activity.<sup>10</sup> It is proposed that one important aspect of this assertion be tested by the following statistical hypotheses.

- (a) The higher the educational attainment among the unemployed, the greater is the quantity of time spent per person day on productive activity. These results are expected to hold for the TWAS Job-Family Obligations Groups that are comprised of unemployed persons.
- (b) In a regression equation that predicts the amount of personal time spent on total productive activity, the coefficients for less than high school graduation, and high school graduation plus some trade school, college or university are negative relative to that of college, trade school or university graduation.

In the regression setup, college, trade school or university graduation is the reference category of an educational attainment dummy variable. The other categories are less than high school graduation, and high school graduation plus some trade school, college or university. Several control variables are included. The notion of productive activity cited here means the aggregate of paid and unpaid work of economic value, work of civic value, formal education and job seeking.

The rationale for the hypothesis just stated is that higher educational attainment, given age, gender and living arrangement, stimulates interest in uses of time that are productive, and promotes the expectation that those uses of time will yield worthwhile personal benefits. It is consistent with

the hypothesis that 30% of the unemployed themselves consider that lack of education hinders them in their search for employment, while 40% identified lack of skills as a problem.<sup>11</sup>

As already noted, it is important to understand the costs, as well as the benefits of increased educational activities among the unemployed. We have asserted that the societal impact of increased education would be small in the sense that the expansion of time spent in education would take place at the expense of leisure time, primarily. This means that in order to take on a course or some formal training an unemployed person would be expected to sacrifice more leisure time than productive time. As a result, for such a person the ratio of total time spent in work of economic value to the time spent in leisure time would be higher than the same ratio for those unemployed who are uninvolved in formal educational activities. This higher ratio would reflect the fact that leisure time, the denominator of the ratio, would decrease by more minutes than the decrease in the work of economic value, the numerator of the ratio. This assertion leads to the following statistical hypothesis:

The ratio of total time spent in work of economic value to leisure time is greater for the unemployed who are involved in some education and training than for the unemployed who are not involved in any education and training. This result is expected to hold for the TWAS Job-Family Obligations Groups that are comprised of unemployed persons.

The economic rationale of this result is rooted in the theory of consumption. This theory implies that in times of reductions in income, non-essential expenditures are reduced most. This applies to cutbacks in available time that would accompany the taking on of some schooling or training: the least essential or important activities would be cut back most. In addition, as shown above, the unemployed, compared to either the employed or to those not in the labour force, have a relative abundance of the one key resource – time available for non-essential activities. Moreover, one acquires the habits of effective working and a heightened appreciation of the importance of work through the process of becoming educated. And finally, there is related evidence quoted above

See end notes at the end of the publication.

See end notes at the end of the publication.



concerning the time reallocation occasioned by college-educated mothers when they take on paid employment: sleep tends to be sacrificed more than time spent with children. All we are doing is anticipating an analogous result that applies to the unemployed when they take on training or retraining activities.

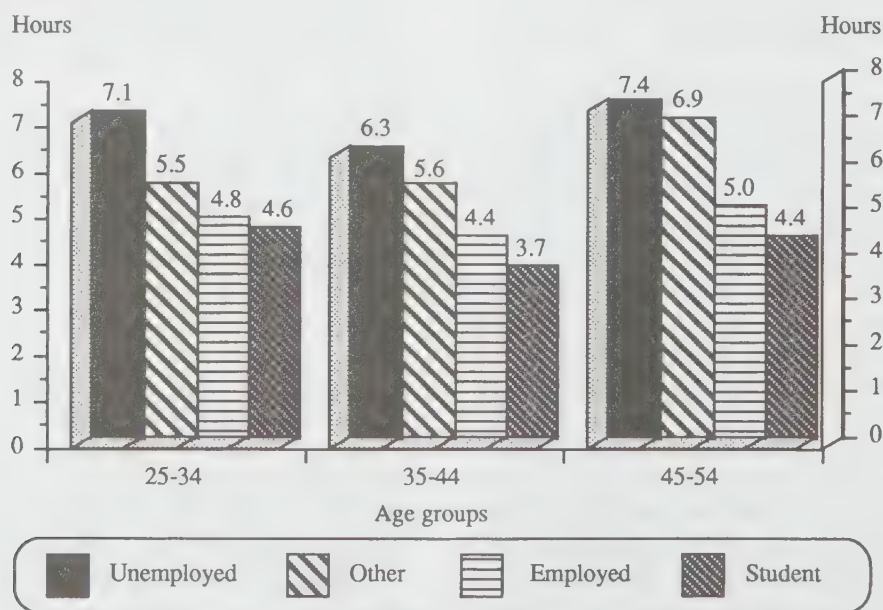
So far the focus has been upon total productive time, rather than upon the time spent doing work of economic value as defined for TWAS. This is because the theoretical rationale for the hypotheses and their significance in public policy debates are stronger when we include aspects of productive activity that are not considered under the TWAS' concept of work of economic value. However, the data presented below includes results where the dependent variable of interest is work of economic value. This restriction of the scope of measurement of work is also relevant to issues being raised in current public-policy debates that focus upon society's potential to create more economic wealth by better use of the unemployed's time.

## 5.2 Main Results of the Statistical Analysis

### 5.2.1 Evidence on the Availability of Time for Retraining

Chart 5.1 allows us to compare the unemployed's quantities of leisure to those of the employed, of students, and of other persons not in the labour force. Survey respondents were classified into these broad groups based on their main activity in the week preceding the survey. In each age group, 25-34, 35-44 and 45-54, the unemployed tend to spend substantially more time in leisure activities than either the employed, or students, or others not in the labour force. The sole exception to this observation is in the 45-54 age group, where the figure for the unemployed is not much higher than that for others not in the labour force (7.4 hours per person per day, versus 6.9 hours). At least a good portion of the unemployed's leisure time might be available for training programs.

Chart 5.1  
Hours of Leisure Time Per Person Per Day, by Age Group and Main Activity,<sup>1</sup> 1992



<sup>1</sup> Main activity in the week preceding the survey.  
Source: 1992 General Social Survey (Statistics Canada).



In considering the patterns in Chart 5.1, the question arises as to whether they would be different if figures for men and women were shown separately. A breakdown of the results by sex (not shown here) tells essentially the same story.

More pertinent to an application of TWAS concepts is a breakdown of the patterns to isolate groups that have relatively high, or low, levels of unpaid work related to family obligations. Chart 5.2 shows quantities of leisure time for adults with preschoolers and perhaps older children, those with older children but no preschoolers, and those with no children at home. By subtracting the average time spent in leisure activities of the employed given in Chart 5.2 from that of the unemployed, it appears that the unemployed with preschoolers spend about 1.5 hours more time in leisure activities compared to the employed. The difference between the unemployed and the employed is even greater in the other two categories of population based on the presence of

children in the home. Thus, once again the unemployed in each of the groups appear to spend more time in leisure activities than the employed, students, and others not in the labour force. However, the differences between the unemployed and others not in the labour force are generally closer in Chart 5.2 than in Chart 5.1.

Whether the patterns just reported would be seen when several relevant variables are simultaneously controlled is a relevant question. This can be addressed by means of a regression analysis that takes into account of the simultaneous statistical influence of several variables on the quantity of time spent in leisure time. The unit of observation in such regressions is the individual respondent. The dependent variable is the respondent's amount of time spent in leisure activities, measured in minutes per day. The key explanatory variable is the main activity last week: whether unemployed, the reference category of the dummy variable, employed,

Chart 5.2  
Hours of Leisure Time Per Person Per Day, for Persons Aged 25-54,  
by Presence of Children in the Home and Main Activity,<sup>1</sup> 1992



<sup>1</sup> Main activity in the week preceding the survey.

<sup>2</sup> No preschool-aged child in the home.

<sup>3</sup> At least one preschool-aged child in the home.

<sup>4</sup> Persons not in the labour force and who were not students.

Source: 1992 General Social Survey (Statistics Canada).

student, or otherwise not in the labour force. The other explanatory variables are age group (25 to 34, 35 to 44, and 45 to 54), sex (female and male), living arrangement (living alone, living with others but not a spouse, and living with spouse), presence of children (no children present, non-preschoolers only present, preschoolers present), day of the week (Monday to Thursday, Friday, Saturday, and Sunday), and survey month. Precise operational definitions for these variables are provided in Appendix 5.2.

Regression results for men and women separately are shown in Table 5.1. Among women, the pattern of regression coefficients supports the observations provided by Charts 5.1 and 5.2. The coefficients for the employed, students, or others not in the labour force are negative relative to that for the unemployed. Among men, this is true only for the employed and for students. For each sex separately, these negative coefficients for the employed and for students are very unlikely to have arisen by chance.

In summary, the data suggest that the unemployed have a substantial surplus of time for leisure activities compared to the employed. This is scarcely a surprising result. What is notable here is that it is seen even after taking into account indicators of the unpaid work activities and obligations of these groups.

### **5.2.2 Evidence on the Benefits of Formal Education Among the Unemployed**

The statistical hypothesis concerning the benefits of education is that “the higher their educational attainment among the unemployed, the greater is the quantity of time spent per person day on productive activity.” Here productive activity includes paid and unpaid work of economic and civic value, job seeking and formal education and training. These results are expected to hold for the unemployed classified by age group, gender and levels of indicators of presence of family obligations.

Charts 5.3 to 5.8 display the statistical association between total work and level of educational attainment for selected demographic groups. These associations are presented for the unemployed classified according to three levels of educational attainment. The levels of education are: (1) less

than high school graduation, (2) high school graduation and/or some trade school, technical collage or university, and (3) a university, college or trade school diploma. In order to simplify the discussion of results, the last two categories are referred to as “high school”, and “a college degree”, respectively. Charts 5.3 to 5.5 deal with total productive activity. Charts 5.6 and 5.7 deal with total work of economic value.

Chart 5.3 shows that the college-educated unemployed men and women, aged 25 to 54, put in substantially more productive activity each day than unemployed men and women with less education. College-educated women do over half an hour more a day than their less-educated counterparts, while college-educated men do almost two hours more per day.

In the 25-34 and 35-44 age groups, total productive activity seems to be substantially greater for those with college degrees than for others (Chart 5.4). In the 45-54 age group total productive activity is greatest for those with only high school education. Only with the 35-44 age group does total productive activity among the unemployed seem to monotonically increase with a rise in educational attainment.

When the unemployed are classified into groups according to the presence of children in the home (Chart 5.5) we see again that total productive activity tends to be greater for those with college degrees than for others. The differential is very sharp for those with no children at home. It is much less sharp in the two groups that have children in their homes.

Clearly, education is only one factor in explaining total productive activity. Moreover, what might appear to be an indication of influence by education in Charts 5.3 to 5.5 might actually be the result of the association of education with other explanatory variables. This issue has been addressed partly by estimating a regression equation that predicts the amount of personal time spent on productive activities (work of economic and civic value, on job seeking and on formal education and training) from a set of explanatory variables that includes educational attainment: (1) less than high school graduation, (2) high school graduation plus some trade school, college or university, and (3) college, trade school or

Table 5.1  
**Regression Analysis of Minutes of Leisure Time  
 Per Day, for Females and Males Separately**

Variables <sup>1</sup>	Categories	Parameter estimate	Estimate of t statistic
	<b>Female<sup>2</sup></b>		
INTERCEPT		467.6	18.3
MAINALWK	EMPLOYED	-129.9	-7.4
	OTHER	-41.5	-2.3
	STUDENT	-156.1	-5.5
AGE25_54	25-34	-29.0	-3.1
	35-44	-37.2	-4.1
LIVEARR1	ALONE	33.0	2.4
	OTHER	30.7	3.4
LIVEARR2	NOCHILDN	72.1	6.9
	OTHRCHDN	45.8	4.5
DAY_TYPE	MON-THU	-170.2	-17.9
	FRIDAYS	-132.1	-10.9
	SATURDAY	-28.2	-2.3
SURMNTN	1	14.1	0.9
	2	1.9	0.1
	3	30.8	1.9
	4	-3.0	-0.2
	5	14.4	0.9
	6	-6.6	-0.4
	7	49.1	3.0
	8	31.2	1.9
	9	-23.3	-1.5
	10	-19.3	-1.2
	11	-29.1	-1.8

See footnotes at the end of the table.



Table 5.1  
**Regression Analysis of Minutes of Leisure Time**  
**Per Day, for Females and Males Separately – Concluded**

Variables <sup>1</sup>	Categories	Parameter estimate	Estimate of t statistic
	<b>Male<sup>3</sup></b>		
INTERCEPT		516.2	20.5
MAINLWK	EMPLOYED	-108.6	-7.2
	OTHER	58.2	2.8
	STUDENT	-143.5	-4.1
AGE25_54	25-34	0.5	0.1
	35-44	-25.1	-2.4
LIVEARR1	ALONE	51.9	3.8
	OTHER	67.7	5.2
LIVEARR2	NOCHILDN	54.8	4.7
	OTHRCHDN	38.0	3.2
DAY_TYPE	MON-THU	-203.3	-17.3
	FRIDAYS	-189.8	-12.9
	SATURDAY	-49.8	-3.4
SURMNTH	1	9.5	0.5
	2	42.9	2.3
	3	-21.8	-1.1
	4	-6.7	-0.4
	5	-11.1	-0.6
	6	-28.3	-1.5
	7	39.9	2.1
	8	10.0	0.5
	9	3.2	0.2
	10	-3.4	-0.2
	11	-17.3	-0.9

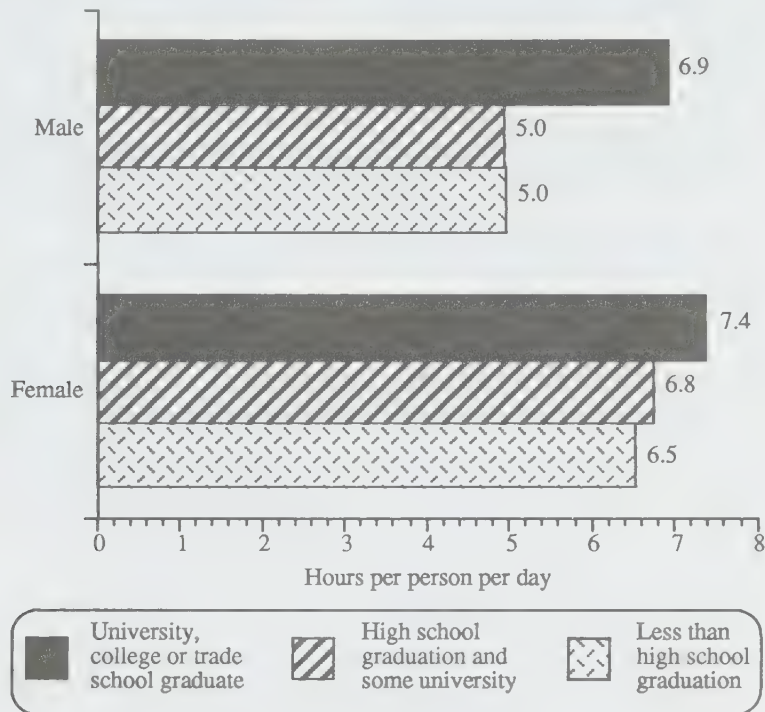
<sup>1</sup> Definitions of the variables and their categories are found in Appendix 5.2.

<sup>2</sup> R-squared is 0.219.

<sup>3</sup> R-squared is 0.252.

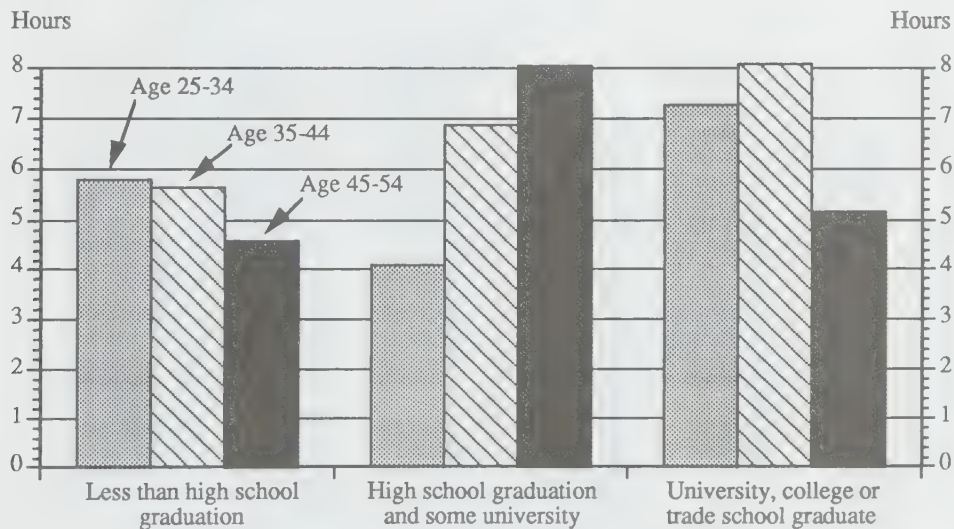
Source: 1992 General Social Survey (Statistics Canada).

Chart 5.3

**Hours of Productive Activity Per Person Per Day, for Unemployed Persons Aged 25-54, by Sex and Level of Education, 1992**

Source: 1992 General Social Survey (Statistics Canada).

Chart 5.4

**Hours of Productive Activity Per Person Per Day, by Age Group and Level of Education, 1992**

Source: 1992 General Social Survey (Statistics Canada).

university graduation. Also included are several control variables. These variables include sex, living arrangement, day and month surveyed, household income and home language. The subjects of analysis are the 260 unemployed women and men aged 25 to 54 surveyed in the time use survey. Due to the small size of the sample, statistically significant coefficients are not common in the results (not shown here).

However, the results of the regression analysis tend to support Charts 5.3 to 5.5 in showing that, with the selected control variables held constant, total productive activity tends to be greatest for those with college degrees, among the three educational classes. Regressions were also run for men and women separately, and for each sex the regression coefficients for the lower education categories are negative relative to that for persons with a college degree.

Total productive activity goes well beyond efforts that create economic goods and services that might be sold in a marketplace. The concept of work of economic value is designed to focus upon time

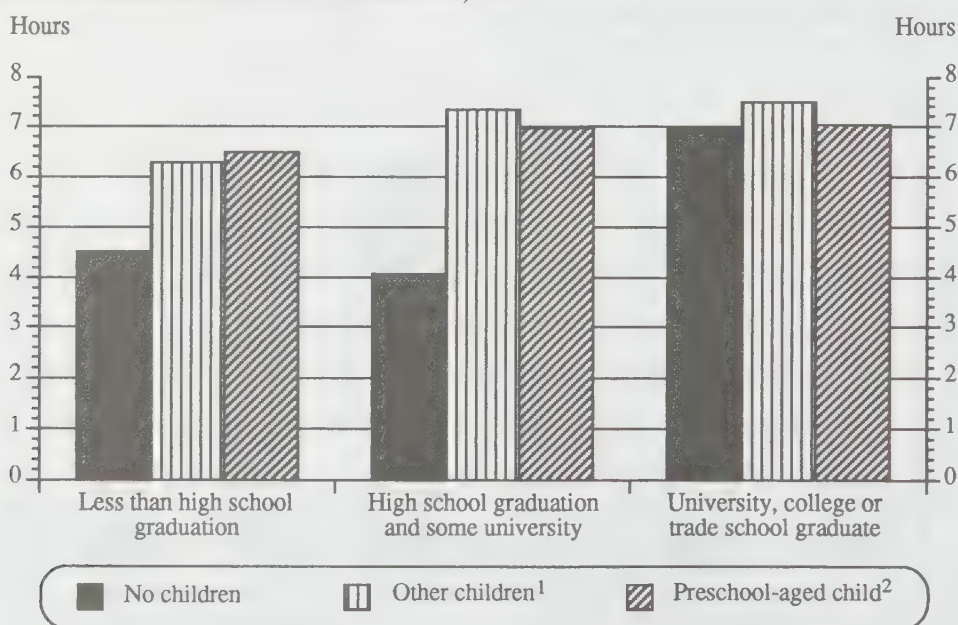
spent creating this subset of goods and services. Whether, among the unemployed, increased education tends to be associated with a greater tendency to spend time doing work of economic value is a question of interest. Charts 5.6 to 5.8 may be used to address this question. These charts have the same structure as Charts 5.3 to 5.5, except that time spent doing work of economic value, rather than total productive time, is being associated with educational attainment.

Chart 5.6 shows that unemployed men and women, aged 25 to 54, with college degrees put in somewhat more work of economic value each day than unemployed men and women with less education. The work done would be mainly unpaid work, with little if any paid work. College-educated women do at least 48 minutes more work a day than their less-educated counterparts, while college-educated men do at least 17 minutes more work per day.

Chart 5.7 shows the statistical association between total work of economic value and educational attainment by age group, for the unemployed. Only

Chart 5.5

**Hours of Productive Activity Per Person Per Day, by Presence of Children in the Home and Level of Education, 1992**



<sup>1</sup> No preschool-aged child in the home.

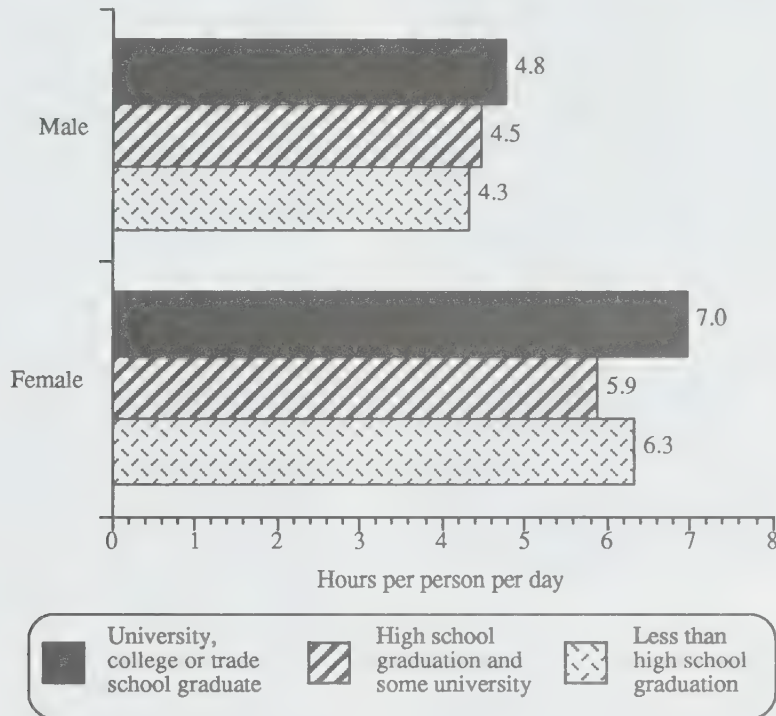
<sup>2</sup> At least one preschool-aged child in the home.

Source: 1992 General Social Survey (Statistics Canada).



Chart 5.6

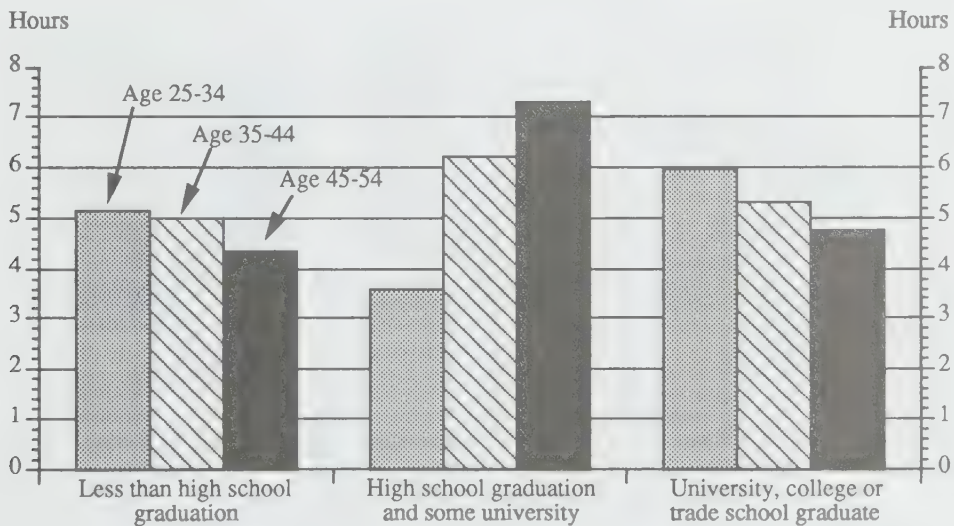
### Hours of Work of Economic Value Per Person Per Day, for Unemployed Persons Aged 25-54, by Sex and Level of Education, 1992



Source: 1992 General Social Survey (Statistics Canada).

Chart 5.7

### Hours of Work of Economic Value Per Person Per Day, by Age Group and Level of Education, 1992



Source: 1992 General Social Survey (Statistics Canada).

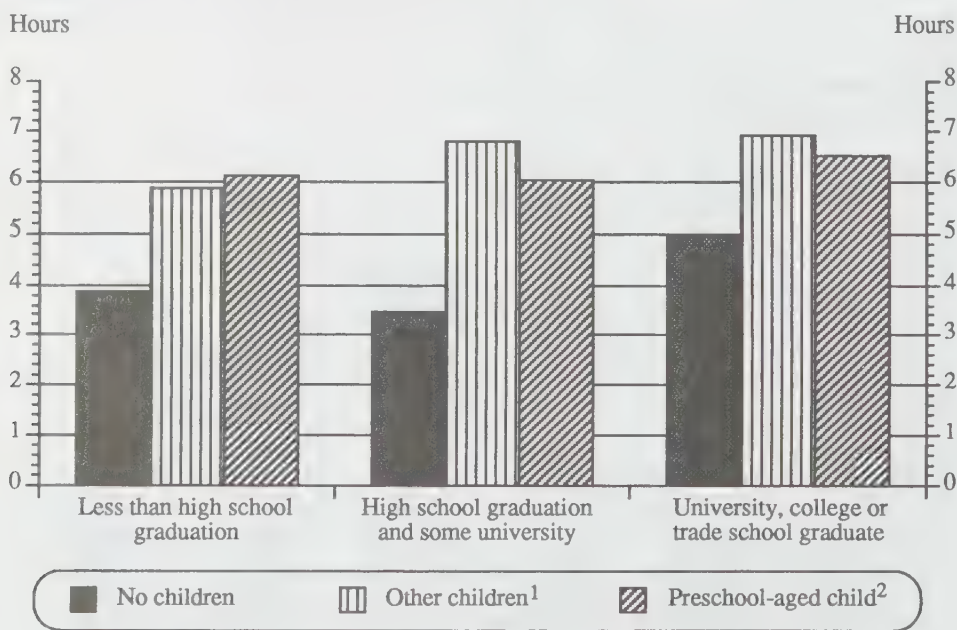
in the 25-34 age group do the unemployed with a college degree spend more time per day, on average, doing work of economic value than do either of the two classes with less education. The unemployed 25 to 34 years old who have a college degree spend more time doing work of economic value per day, on average, than those without high school education. However, the latter group spend more time doing work of economic value per day than those with high school education. Among the 35 to 44 and 45 to 54 age groups, it is those with high school education that spend the greatest amount of time per day doing work of economic value.

Among groups of unemployed classified by presence of children in the home, having a college degree is associated with spending the greatest amount of time per day doing work of economic value. Chart 5.8 shows this pattern in each of the three groups: those with a preschool child at home, those with other children (none preschool) at

home, and those with no children at home. However, the differentials by educational category are not large.

This observation is supported by the results of a regression analysis similar to that reported above. In this analysis the dependent variable is total time spent doing work of economic value, instead of total productive time (which was the subject of the discussion on regression analysis above). The control variables are the same ones as listed above. In the regression analysis where the dependent variable is total time spent doing work of economic value the coefficients for the two lower educational classes are again negative relative to those for the group with college degrees. However, only among women do the regression results suggest that statistical effect of having a college degree is substantially greater than those associated with the other levels of education. (The detailed results are available from the author. They are not shown here because the sample size is so small that statistically significant coefficients are uncommon in the data.)

Chart 5.8  
Hours of Work of Economic Value Per Person Per Day,  
by Presence of Children in the Home and Level of Education, 1992



<sup>1</sup> No preschool-aged child in the home.

<sup>2</sup> At least one preschool-aged child in the home.

Source: 1992 General Social Survey (Statistics Canada).

It is worthy of note, however, that when several control variables are held constant the regression results do not confirm the pattern in Chart 5.7. This chart suggested that within the chosen age groups, having a college degree is not associated with spending more than the average time (for the whole sample) doing work of economic value. *When age and several other variables are held constant, the holders of college degrees tend to spend the most time, for both work of economic value and for total productive activity, compared with the other education groups.*

Both the charts and the regression analysis fail to indicate that there is a clear pattern of cross-sectional association in which more education is associated with more productive time or more work of economic value. Instead, the data suggest that there is a threshold that separates those with and those without university degrees (or college degrees or trade school diplomas).

Among those without degrees, those without high school education did not show a tendency to spend less time in productive activities than those with high school education, holding several other factors constant, according to the regression results. This observation suggests the *hypothesis* that having or not having a high school diploma is not the key work-output-related discriminator. The key one seems to be having or not have a college degree.

This hypothesis needs to be explored in other studies using larger samples and more suitable data. If it is supported in other studies, it might have notable implications for the design of training opportunities for the unemployed. For example, it might mean that a marginal addition to the education of the unemployed who lack high-school-level education may not have great pay-off in enhancing their effectiveness in wealth-production endeavours. A key contribution of the TWAS in this context is that it allows this issue to be explored in a context where productive work is defined more broadly than is the case where it is restricted to mean work for monetary pay.

In conclusion, the charts and the results of estimating the regression equations provide additional support for the hypothesis that there are benefits in the form of increased work of economic value and productive activity coincident with

achieving the higher levels of education. They do not support the hypothesis that higher levels of education *below* the college level are associated with corresponding increases in productive time. However, both results need further testing with other datasets.

A major limitation of this analysis needs to be stressed here. The analysis has not been able to draw upon longitudinal data that reflect *changes* in time spent on education by a cohort who were unemployed at an initial point of time. The best we can do is look at association of work output, or of total productive time, with level of educational attainment at a given point of time. If longitudinal data were available, a quite different pattern of relationships than those described above might be revealed.

### 5.2.3 Evidence on the Societal Impact of Acquiring Education – Aspects of the Cost Dimension

So far the text has emphasized the potential benefits of the unemployed having more education. As already emphasized, investment in human capital needs to be assessed from the cost side as well as from the benefit side. This section provides information relevant to considerations about the costs, though only indirect and selected aspects of costs are studied.

The third major assertion that guides this work is that the societal impact of increased time spent on education by the unemployed would be small in the sense that the expansion of time spent in education would take place mainly at the expense of leisure time. It is expected that in order to make time for educational activities, the unemployed will tend to reduce their time spent in leisure activities more than their decrease in commitment to productive activities. As a result, the person's ratio of total productive time to leisure time would increase, because leisure time, the denominator of the ratio, would decrease by more minutes than the decrease in total work time (less the time spent on education). We expect this assertion to be correct even if the numerator of the ratio is limited to work of economic value, which is a subset of total productive time.



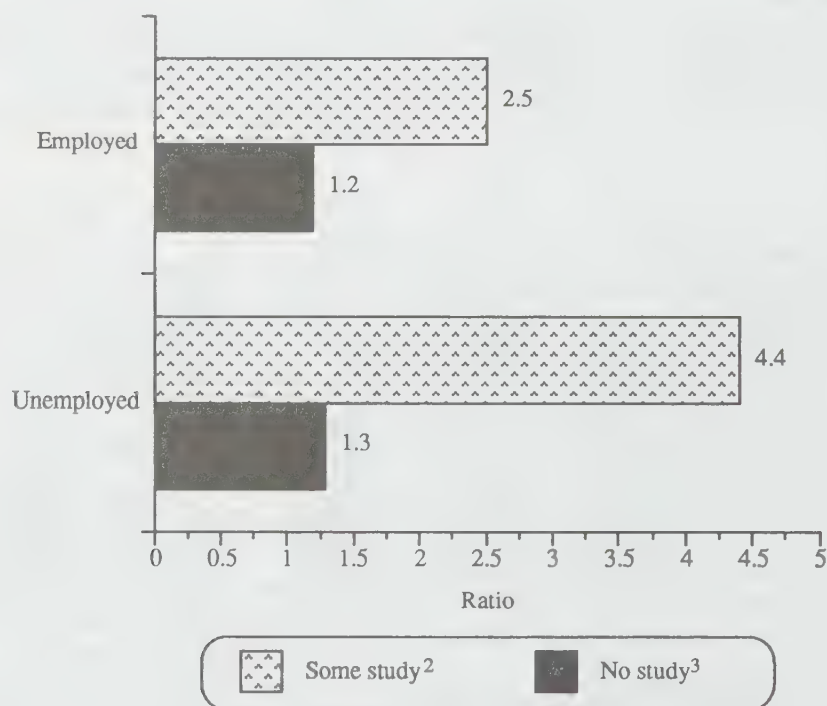
Without longitudinal data, however, a hypothesis relating to this assertion cannot be tested. The best that can be done with existing data is to compare the ratio of work of economic value to leisure time for the unemployed who study or take training, called "students", with those unemployed who do not study or take training, the "non-students". This ratio, measured for the unemployed who study, exceeds that for the unemployed who do not study: 4.4 versus 1.3, refer to Chart 5.9.

A problem with this evidence is that it is based on a very small sample of unemployed persons who study. There are far more employed adults who report study. Among the employed the ratio of work of economic value to leisure time is much higher for those who report study than for those who do not report study, 2.5 compared to 1.2 – Chart 5.9.

In conclusion, the data *suggest* the hypothesis that increased time spent in education will have a small societal impact in the sense that those involved are more likely to draw down their time spent on leisure activities rather than that spent on other productive activities. This notion is suggested by the data even when the set of productive activities is limited to unpaid work of economic value. If substantiated by more appropriate data, the hypothesis means that offering the unemployed enhanced educational opportunity is unlikely to lead to reduction in the average time they spend meeting obligations for unpaid work of economic value, such as many forms of family support. Again we emphasize that a longitudinal analysis is needed to provide a direct test relating to this important hypothesis concerning costs associated with investment in human capital by the unemployed.

Chart 5.9

**The Ratio of Unpaid Work of Economic Value to Leisure Time of Unemployed and Employed Persons, by Study Status,<sup>1</sup> 1992**



<sup>1</sup> Persons who report, and do not report, study or schooling on the diary day.

<sup>2</sup> Some minutes of study or schooling reported.

<sup>3</sup> Zero minutes of study or schooling reported.

Source: 1992 General Social Survey (Statistics Canada).

However, many who already have major family support obligations may have great difficulty finding the time to make use of educational opportunities unless the latter are designed in family-friendly ways. This remark probably applies with even greater force to the employed who need educational upgrading. *An important feature of the TWAS is that it is the only national labour accounting system in Canada that allows these issues to be explored when full account is taken of person's obligations to provide unpaid work outputs in support of their families and communities.*

## Appendix 5.1

### The Human Capital and Work of Civic Value Concepts

M. Woodhall<sup>12</sup> notes that many economists believe that “education and training create assets in the form of knowledge and skills which increase the productive capacity of manpower in just the same way as investment in new machinery raises the productive capacity of the stock of physical capital”. Education and training create assets called human capital. The process of acquiring human capital is called Investment in Human Capital, IHC. Such a process consumes many resources, such as time, money and books.

Work of Civic Value (WCV) is any activity carried out by an individual that is deemed to be part of one's civic responsibilities, such as voting, attending political meetings, cleaning up the environment either alone or as part of a group or association, writing a letter to one's member of parliament, attending a planning meeting at one's church or neighbourhood association, sitting as a board member of a voluntary association, or taking one's children to a cultural event. More formally, WCV is unpaid non-investment activity undertaken by an individual that, by its nature, is thought to yield more public, community or societal benefits than private or family benefits. This means that taking formal courses is not deemed to be WCV (this is an investment in

human capital that will yield a stream of civic and private benefits in the future), nor is attending a worship service (because private and investment benefits predominate), nor is attending an opera (because the private benefits are assumed to predominate); though taking one's children to worship, opera or a museum is deemed to be WCV.

Some activities produce outputs that have both economic value and civic value. In many cases, however, outputs of work of civic value do not have any equivalent outputs that are sold in labour markets. Though such activities are thought to be essential to the promotion of peace, order and good government; effective and just local communities; more publically sensitive schools, hospitals, businesses and other institutions; and civic minded and environmentally sensitive citizens. It is only by quantifying the civic contributions of citizens that the value of basic institutions such as the family, school, faith, community and voluntary associations will be more fully appreciated.

## Appendix 5.2

### Variables in Regression Equations

DURLEISR: Dependent variable, minutes of leisure time reported on the diary day

MAINLWK: Main activity last week

EMPLOYED: Employed last week  
OTHER: Other main activity last week – neither employed, unemployed nor student

STUDENT: Student last week

UNEMPLOY: Unemployed last week

AGE25\_54: Age group

25-34: Aged 25 to 34

35-44: Aged 35 to 44

45-54: Aged 45 to 54

See end notes at the end of the publication.

LIVEARR1:	Living arrangement
ALONE:	Lives alone in the household
OTHER:	Lives with other(s), but not a spouse
SPOUSE:	Lives with spouse
LIVEARR2:	Presence of children in the household
NOCHILDN:	No children
OTHRCHDN:	Older child(ren), non-preschoolers
PRESCHLR:	Preschooler(s), plus perhaps older children
DAY_TYPE:	Day of the week for the time budget
MON-THU:	Monday, Tuesday, Wednesday or Thursday
FRIDAYS:	Friday
SATURDAY:	Saturday
SUNDAY:	Sunday
SURMNTNTH:	Survey month, 1 = January, 12 = December



## Chapter 6

## Fields for Issue-Oriented Studies that the Total Work Accounts System Might Support

As stated at the outset, the TWAS has been designed to support the conduct of information development and analysis across a broad front of public policy concerns. Some of the fields within which pertinent concerns arise are indicated by the following headings:

### *Interdependence among unpaid domestic work, voluntary community support work, and work in paid labour markets*

- Adequacy of compensation received by those who devote themselves to family work and community work;
- Implications of global reduction in parental child care-time that may come from increases in the proportion of married younger women whose patterns of time inputs to paid work outside the home resemble closely those typical for men;
- Overload of key employees with institution-based demands may threaten the achievement of adequate supplies of 'family-oriented work', and the health of key employees who cannot find ways to balance demands arising from family work with those arising from market work;
- Impact upon corporate performance of knowledgeable handling of key employees' familial obligations;
- The volume and pattern of human inputs to market production processes, and productive use of time while on the job;
- Costs to women of having made a pattern of choices as regards the balance between market and non-market work over the course of their lives.

### *Documentation of and improved visibility of non-market work that contributes to effective functioning of markets*

- Child care;
- Elder care;
- The social infrastructure of family/friend support work and community-support work that allow the market's operations to have predictable outcomes.

The foregoing fields of concern, are linked to specific policy-issue areas in which, information products based on the TWAS might find application. A list of pertinent policy-issue areas follow:

- I. Large-employer policies, regarding professional development strategies and staff relations:
  - (a) Work-environment policies to promote more satisfactory balancing of employees' work and family obligations;
  - (b) Fine-tuning the design of professional development and training programmes to be responsive to the inter-group differences in availability of discretionary time;
  - (c) Fine-tuning the definition of employment equity and the pursuit of employment-equity goals (by access to improved information about inter-group differences in time pressures arising from family obligations).
- II. Government and corporate level labour supply management policies:
  - (a) Improved effectiveness of policies can be achieved by information about group differences in the availability of disposable time. Measurement of disposable time should take into account, people's obligations for both unpaid-work as well as paid-work. This is important in sectors where women provide substantial proportions of aggregate labour input, or in organizations where women are a significant part of the corporate professional or managerial resources, that need to be retained and developed;
  - (b) The design of income support programmes, or income enhancement opportunities, for groups with highly variable paid-work-force attachment, will be more effective when it is supported by information about the close links between market and non-

market work effort, that is typical among such groups. The income dynamics of these groups, are strongly influenced by the choices they make between competing needs to contribute work effort in both the paid labour market and elsewhere.

III. Policies designed to compensate or provide support to key groups for their contributions toward relieving pressure on public resources, regarding the delivery of personal services:

- (a) Care givers to the ill and disabled, or functionally handicapped;
- (b) Suppliers of valuable labour inputs to organizations and other groups on a voluntary basis;
- (c) Rearers of young children, who do not have paid-work attachments, as bases for current or future claims upon publicly funded goods and services reserves;
- (d) Potential impacts of certain patterns of reduction in government support services on the production of unpaid work outputs by selected population groups.

IV. Measuring the population impacts and effectiveness of government- supported social and health services, requires integration of data about programme-services use with data about parallel services received through informal and other private arrangements:

- (a) Measuring the impact and effectiveness of child-care support programmes;
- (b) Measuring the impact and effectiveness of support programmes targeted at the elderly;
- (c) Measuring the impact and effectiveness of health and fitness promotion programmes.

An elaboration of several of the ideas outlined above can be found in Table 6.1. This table lists specific classes of public and private sector organizations and suggests, in detail, areas of policies, programmes and strategic information development, in which outputs from the TWAS could be useful.

In many cases, the useful outputs will not be comprised of series for the indicators or matrices illustrated in the data provided above. Instead, the useful outputs will take the form of special studies, in which key concepts and data from the TWAS

play a crucial role (as illustrated in Chapter 5). Such outputs might also take the form of special tabulations that are tailored to fit user-specified requirements, and which are produced, partly, through the use of key concepts and data from the TWAS.

It is hoped that the Table 6.1 will stimulate thoughts about benefits that might be gained through access to TWAS-based outputs of the kind mentioned above.

Table 6.1  
Marketing Strategies

Users	Objectives
<b>Domestic work</b>	
Public and private enterprises and organizations	Plan the production of substitute or complementary goods and services to domestic production
Employers	<ul style="list-style-type: none"> <li>• Adapt work schedules</li> <li>• Improve productivity, reduce absenteeism and stress</li> <li>• Improve the efficacy of programs relating to employment equity</li> <li>• Offer new work schedules: shared time, work at home, to prevent career interruptions</li> </ul>
Advertising agencies, market research firms	Better recognition of the evolution of consumers needs and uncover new patterns
Insurers and actuaries	Assess the risks, the damages while taking into consideration the production by individuals
Lawyers, Judges	Establish a more precise base for alimony payments, division of property, in case of divorces
Day nurseries	Offer more flexible services in terms of timetables
Tax Department	Adapt fiscal dispositions to the double contribution by women, in particular, tax credit for married persons, taxation of alimony
Department of Human Resources Development, analysts and researchers of labour market, organizations for promotion of equality	<ul style="list-style-type: none"> <li>• Analyse the offer of work to certain groups while taking into consideration family obligations beyond the number and age of children</li> <li>• Explain the differences in the offer of work at the international level</li> </ul>
Commission on Human Rights, organizations for promotion of equality, analysts and researchers of labour market	<ul style="list-style-type: none"> <li>• Enrich the analysis of the different causes for discrimination; better evaluate the programs for job equality, propose new solutions to reduce the impediment to equality</li> <li>• Analyse the determinants to salary margins between men and women; draw up appropriate policies</li> </ul>
Social security legislators	<ul style="list-style-type: none"> <li>• Measures of protection of income for periods devoted to domestic work, e.g., child care</li> <li>• Measures of compensation in case of illness or inability to perform domestic tasks</li> </ul>
Department of Social Welfare, Department of Income Security, organizations with social inclinations (United Way), researchers interested in poverty issues, allocation of revenues	<ul style="list-style-type: none"> <li>• Evaluation of the disparity in net revenue (including goods and services from domestic work)</li> <li>• Estimate of the influence of economic cycles on net revenue</li> <li>• International comparisons in standard of living and quality of life</li> </ul>
Departments and organizations in charge of forecasting labour demands; researchers in labour market	Evolution in the demand for certain professions in substitute services to domestic tasks
Researchers and analysts of household expenditures	<ul style="list-style-type: none"> <li>• Clarify the issues in the substitution and/or the complement between domestic and market production</li> </ul>



Table 6.1  
Marketing Strategies – Continued

Users	Objectives
Researchers and analysts of household expenditures – Concluded	<ul style="list-style-type: none"> <li>• Study in depth the impact of the activity of women on the demand for goods and services corresponding to precise domestic tasks</li> <li>• Estimate the real cost of the expenditures for certain goods and services (waiting file)</li> </ul>
Departments of Health and Social Welfare, organizations or groups producing social estimates, demographers	Analysis of the evolution of the reproduction rate; demographic estimates
<b>Care of family members</b>	
Organizations in research and family promotion	Analyse the influence of the different work schedules, double tasks and other responsibilities upon the traditional family structure
Department of Health, Community organizations in health and social services, hospitals	<ul style="list-style-type: none"> <li>• Evaluation of the care requirements; planning of the offer for services and equipment</li> <li>• Analysis of the requirements by ethnic origin and cultural tradition</li> </ul>
Private businesses	Planning the production of goods and services meant for home care
Employers	Measures to improve productivity, reduce absenteeism and stress
Department of Human Resources Development, analysts and researchers of labour market	Analyse the work offer of certain groups, especially age; evaluate family obligations in terms of time allotment
Department of Labour	Evaluate the possibility to legislate for leave of absence for care of sick relatives (family members)
Department of Social Welfare, of Income Security	Assure financial support to caregivers who leave their job or reduce their hours of work
<b>Voluntary service</b>	
Voluntary organizations, charitable organizations, researchers	<ul style="list-style-type: none"> <li>• Identify and analyse the determinants of volunteer work by type of activity and the socio-economic characteristics of the volunteers</li> <li>• Evaluate the influence of the direct and indirect costs for offer of services</li> <li>• Analyse the evolution of volunteer work by life cycle</li> </ul>
Employers	Systematically take into consideration the experience and qualifications acquired in volunteer work; establish equal values
Department of Health and Social Welfare, researchers in the field of the evolution of social structures	Analyse the evolution and the new methods of social solidarity and their interaction with family solidarity

Table 6.1  
Marketing Strategies – Concluded

Users	Objectives
<b>Education</b>	
Department of Education, post-secondary and university teaching institutions, researchers	<ul style="list-style-type: none"> <li>• Forecast and analyse the demands for education from various groups</li> <li>• Recognize the respective influences of different reasons for the demands</li> <li>• Evaluate of shortfall of earning for students and obtain of more reliable base of calculation for student loans</li> <li>• Study of costs-benefits of education</li> </ul>
Departments of Human Resources Development, development organizations, associations whose objective is promoting equality, employers, researchers	<ul style="list-style-type: none"> <li>• Better understanding of barriers existing in permanent training affecting certain groups, especially women with family responsibilities</li> <li>• Analyse the choices between types of training</li> <li>• Estimate the interaction between public expenditures and private investment in education in terms of time and money</li> </ul>
Department of Education, social development organizations, researchers	Analysis of the different factors which determine the equality of access to education
<b>Home to work commuting</b>	
Department of Transportation, municipalities, public transport organizations, researchers	<ul style="list-style-type: none"> <li>• Expectation of transport demands</li> <li>• Planning and adaptation of proposal by method of transport</li> <li>• Analysis of model choice</li> <li>• Instituting policies for differential schedule of prices</li> <li>• Adaptation of methods of transport (rapidity, comfort, flexibility)</li> </ul>
Researchers, analysts of labour market, employers	Analysis of determinants of job offers for women; analysis of spatial dimensions of the professional segregation; establishing new methods of work (flexibility of schedule, work at home)
<b>Leisure time</b>	
Department of Environment, municipalities	Develop ways to reduce air pollution caused by road traffic
Researchers and analysts of labour market	Analysis of determinants of job offer and its' development
Businesses producing leisure goods and services, marketing studies, advertising agencies, researchers, leisure organizations, Department of Human Resources Development	Analysis of factors influencing the demand for leisure goods and services; planning of the offer of these products by different segments of the population; research in the evolution of leisure choices and needs; expectation in the demand of specialized manpower for the production of leisure goods and services
Employers, Department of Employment, syndicates, researchers	Evolution of the contents of work contracts and collective bargaining; introduction of new types of social advantages; flexibility of working conditions by different groups of workers





## Appendix A

# Operational Definitions of Destinations of Work of Economic Value

The following is a set of operational definitions that are strictly linked to the properties and limitations of the 1992 GSS database. The definitions often represent an effort to impute specific beneficiaries to work activities on the basis of the nature of the activity and the presence of particular persons during the conduct of the activity.

This imputation was needed because the GSS questionnaire did not ask respondents to identify the perceived beneficiaries of their work activities. This gap is a major limitation of the GSS database for the purposes of the TWAS.

Another serious limitation arises from the fact that respondents were generally not encouraged to identify multiple activities that occupied the same time block (e.g., cooking while doing child care). Such activities as may have been reported are not visible in the database because the data coders classified activities, wherever feasible, so that the aggregate of time used by any single person would be a figure equal or very close to 24 hours.

Neither of the two limitations just cited leads to an inherent defect in the TWAS. As soon as more suitable data become available they can be loaded into the TWAS with no modification of the TWAS' design. *Because the entire system rests on a microdata file, definitions such as those shown below can be quickly changed so that an entirely new set of numbers is produced. Also, future datasets that include multiple activities within a specific time block pose no threat to the TWAS; because the master file of the TWAS is an event-based file, not a person-based file.*

Plain language cannot render some of the following definitions clearly. This is because of complex Boolean logic structures built into some of the definitions. Hence the following set of definitions in plain language are less precise than the corresponding computer program code.

*Destination 1: Business (excluding Community Services)* – actively providing paid work output to business (excluding Community Services). Travel to Work is allocated to Destination 9 (defined below) for two reasons. (1) The data do not allow one to separate those who were carried to work by others from those who 'carried themselves'. (2) those who 'carried themselves' were not producing outputs destined for business – they were the consumers of the outputs.

*Destination 2: Government and Community Services* – actively providing paid work output to government or community services.

*Destination 3: Business, unpaid work* – actively doing unpaid work for a business.

*Destination 4: Other organizations accepting volunteer workers* – actively doing volunteer work and in contact with "others" (non-family and non-friend) during that particular work (this is classified to work for voluntary organizations though we can't be sure).

*Destination 5: Spouse and other household members (including self)* – doing domestic work and in contact with one's spouse during that particular work.

*Destination 6: Child* – ... doing domestic work, or routine shopping, or Care of Children, and in contact with the child during that particular work.

*Destination 7: Adult family member (excluding spouse) and other household members (including self)* – ... either doing domestic work and in contact with other family members during that particular work, provided the person is a single child living with a parent, or doing Adult Medical Care while at home and in contact with other family members, or Giving Help and Personal Care to Adults.

*Destination 8: Other relatives and friends* – doing either of Meal Preparation, Meal Clean-Up, Routine Shopping, Washing, Dressing, Packing, Adult Medical Care (At Home), Help and Personal Care to Adults, and in contact with either of friends, or others during that particular work (if not already assigned to category 7).

*Destination 9: Self and other members of the household (if any) – ... doing either of Meal Preparation, Meal Clean-Up, Routine Shopping, Washing, Dressing, Packing, Adult Medical Care (at home), and reportedly alone during that particular work (imputation of work output of economic value – service you would have to buy if you could not do it for yourself – to self).*

*Destination 10: Work-related activities that produce no output other than that used by the person doing the work – time spent either as idle time *on the job*, or for meals at work, or for travelling to and from work, or at home for meals provided the person reported domestic work or child care or Adult Medical Care (at home), or Help and Personal Care to Adults. This will be treated as work-related time probably not available for disposal elsewhere. The effect of the second clause (that dealing with work at home) is to put snacks while working at home on the same footing as snacks while working away from home.*

## End Notes

### Chapter 1

- 1 Attempts to apply our definition will lead one into certain "grey areas" – kinds of activity that are difficult to classify without taking an arbitrary decision. Self-education activities are examples. Our handling of a number of these "grey areas" implies that our definition is not equivalent to the third-party criterion. It is worth nothing, as well, that other definitions of "work of economic value" could have been chosen in the light of pertinent guidelines from leading economic theorists (for related discussion see Chicha-Pontbriand 1983).
- 2 It is acknowledged that there is a strong case to support the contrary principle that it is essential to take into account the intentions of the doer of the work. We have chosen the principle that is more readily applicable with available time use data.

### Chapter 2

- 3 Almost all groups each contributing less than 2% of the total number of episodes of work of economic value have been omitted from the tables shown here. For many of the omitted groups, the distributions would be highly subject to sampling variability. Indeed this is true for even some groups shown in Table 2.2; but they are displayed due to substantial interest in their particular patterns of total work output.

### Chapter 3

- 4 Of course, it is quite feasible to break down the latter into finer categories that would separate those with part-time jobs from those without paid employment. It is not done here because the numbers in the table cells would often be too small to be usable.
- 5 In a specific real population, that coefficient would also be a function of other variables, such as one that reflects interregional migration.
- 6 This form of macro-simulation facilitates formulation of explicit assumptions about a series of changes in key group-specific probabilities (e.g., the probability of going

from one educational level to another) over a long period of time and for specific cohorts. For related discussion see Stone 1993.

### Chapter 5

- 7 Although there are few, if any, applications of time budget variables to the study of the human capital of the unemployed, the potential application to manpower planning was foreseen in Canada as early as 1982 (see Harvey 1982). An early application to manpower planning, though one which is not focused specifically on the unemployed, appears in Harvey 1983.
- 8 As a result of his analysis of on-the-job training, Constantine Kapsalis proposes a shift of research. This shift should be away from research on training for the employed and the access to it, to research training for the unemployed who face labour market adjustment problems; refer to *Canadian Business Review*, 1993. This article takes a step in the proposed direction.
- 9 See Hill and Stafford.
- 10 Although quality is not investigated in this study, the TWAS could easily be used for such analysis by taking an approach similar to that in the analysis of the quality of parental care. Educational attainment is the main ingredient in most indices of labour quality; refer to the Canadian Labour Market Productivity Centre 1989/90.
- 11 See Canadian Labour Market Productivity Centre 1988.
- 12 See Woodhall 1987 and Machlup 1987.



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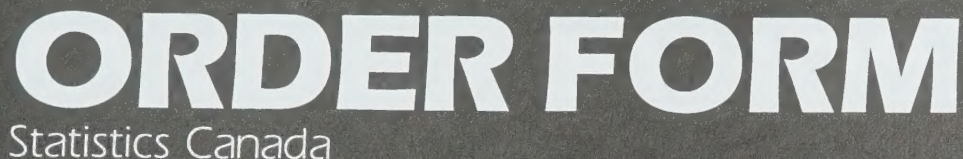
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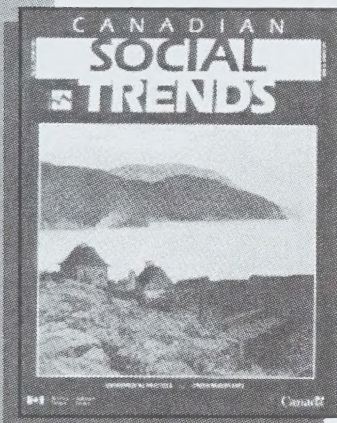
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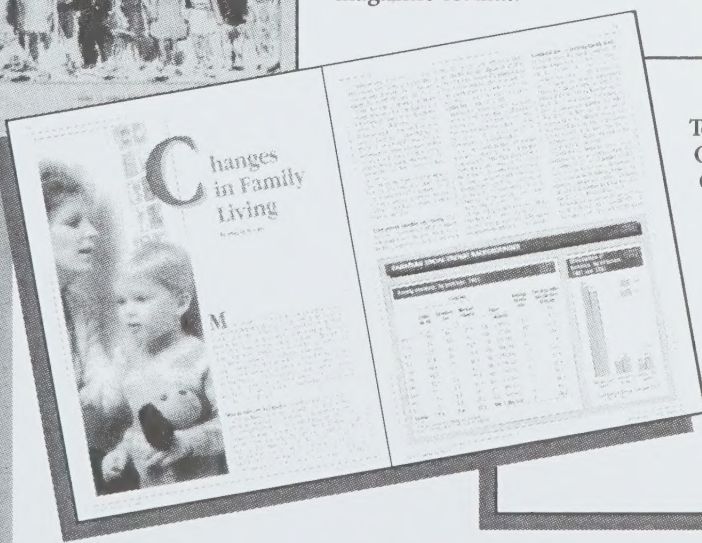
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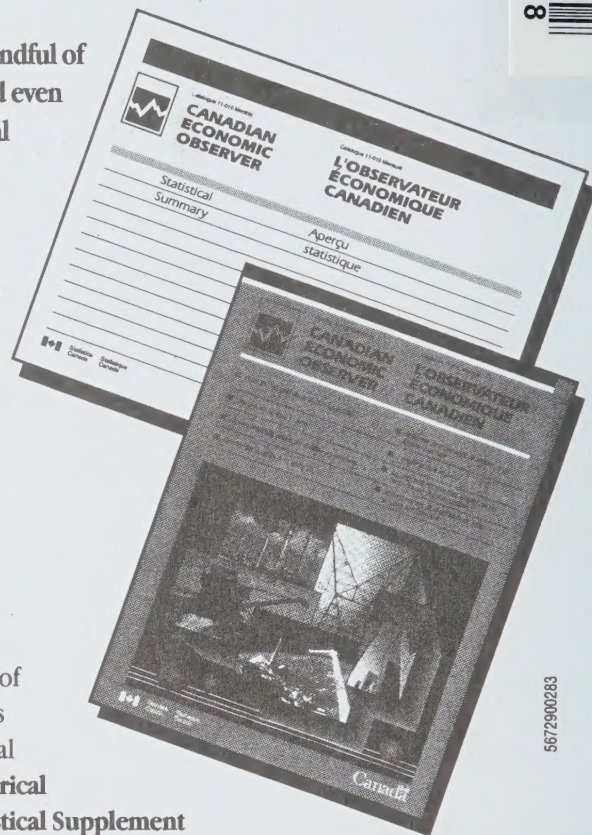
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